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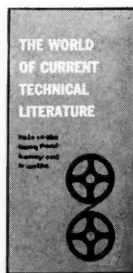
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**METALS REVIEW**



# METALS REVIEW

*The News Digest Magazine*

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## The Editor's Page

This, the January issue of *Metals Review*, appears to be a fitting time to introduce a few changes and take a forward look. Before we do, perhaps we might explain this column. Although it is being introduced without any special fanfare, we hope that its content from month to month will be such that you as a reader will look forward to it with a feeling of friendliness, if not anticipation.

The title heading this column is likely to be changed before too long. The matter of titling is rather important, so we do not want to be hasty. In considering names, we were somewhat taken by "Agglomeration". Cautiously, we checked the dictionary to learn what connotations could be found in such a title. We hastily backed away when we saw this: "Agglomerated—collected into a mass but not coherent". Thus the search continues.

At times it will take on some of the characteristics of an editorial page; at other times it will offer comment—both pertinent and impertinent; again it might be used to carry news which does not fit neatly into any of the established sections of the magazine. It is our hope that this unrestricted approach will provide a constant change of pace and thus not become forced or dull.

### New Columnist

In February, ASM's Managing Director, Allan Ray Putnam, will become a columnist. His column, to appear opposite the inside back cover, will be largely devoted to commentary on Society affairs.

### New Feature

Might we recommend that you take a careful look at the Society's annual report which starts on the opposite page. This is the first time, at least in recent years, the annual report has been distributed to the entire membership. Although published in *Transactions* in previous years, and thus available for reference, this vital information has not

received the attention it merits. We believe it is the right and the duty of ASM members to become acquainted with their Society's activities, problems and progress.

### New Ideas

Other interesting features are planned in future months. All will be designed to be interesting, informative and timely. A key source of editorial material is to be found within ASM. During the winter months ASM chapters hear from 900 to 1000 different technical talks. We know there is a tremendous fund of knowledge in these talks. Our problem is how best to get a high percentage of this valuable information to you.

### Wanted: More Recognition

Many feel that the role of the metals engineer is not sufficiently well recognized by either industry or the public. With this we concur. *Metals Review* will do its part to throw the spotlight of attention on this important group. However, what brings our attention to the problem is a radio report we heard recently. The special report centered about the attorney's office of the future and how this fortunate man could—in effect—push a button and through the magic of electronics receive complete reports of all decisions and precedents pertinent to the case under study.

Actually, what the announcer was talking about was ASM's Documentation Service or a reasonable counterpart. However, had he tried the principle of literature searching as applied to a metallurgical laboratory he might have risked the loss of his audience. We're happy that Documentation, as pioneered by ASM, is adaptable to other fields but would be happier if the thousands of hours and dollars expended by ASM committees and staff associates could have been rewarded with the recognition for progressive action being accorded the legal profession.

T. C. DuMond

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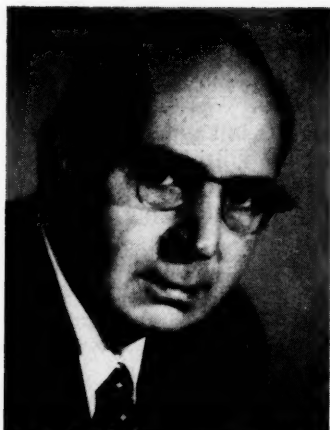
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# "ASM Is Part of an Expanding Universe . . ."

## REPORTS OF 1960 ANNUAL MEETING SHOW SOCIETY LOOKING FORWARD

The Annual Meeting of the American Society for Metals was held in Philadelphia, Pa., at the Bellevue-Stratford Hotel, on Oct. 19, 1960. Reports presented there are indicative of important progress for ASM, and make interesting and informative reading for every member. The complete proceedings of the meeting will be published in Volume 52 of Transactions, to be published about May 1961.



Walter Crafts  
President, 1959-60

### REPORT OF THE PRESIDENT

After losing the experience and guidance of W. H. Eisenman over two years ago, it was necessary to re-evaluate and re-orient the objectives and operations of the Society. It is gratifying to report that the Society is now advancing rapidly under firm direction.

The staff has completed its first year unified in the new headquarters, and its first year under the direction of Allan Ray Putnam.

The Society was indeed fortunate to have found a Managing Director in Allan Ray Putnam, who is eminently capable of administering the affairs of the Society. In his first year he has shown outstandingly creative leadership and has won the enthusiasm and confidence of the staff and members in chapters, committees and the Board of Trustees.

I visited 38 chapters, 29 with Ray Putnam or Ted DuMond, and the other officers and trustees visited 65, for a total of 103. We were greatly impressed with the enthusiasm in the chapters and I want to express our appreciation of their warm welcome and hospitality. I was especially

pleased to renew my associations with Canada in visiting 11 Canadian chapters.

### Finance

Financial problems have been a matter of major concern during the past year. The Finance Committee was reactivated for the first time since 1948, to help in untangling some of the long-term financial problems that became critical in a year of increased costs and lowered income. The Society had a deficit this year and several actions have been taken to restore the financial strength of the Society.

Educational appropriations and operating costs have been cut as much as possible without impairing essential functions. Charges have been imposed or increased for special services utilized by only a limited proportion of the members in order to reduce the subsidies or to make them self-liquidating.

An initiation and reinstatement fee of \$5.00 has been approved at the 1960 Annual Meeting. In this connection it may be noted that the initiation fee does not apply to student membership. The conditions of student membership and subsequent transfer to regular membership are under consideration and an additional proposal can be expected at a future date. Exploration of the feasibility of increasing the annual dues indicated a favorable atmosphere in the Society, but in the judgment of the Board of Trustees it was advisable first to establish a more equitable balance of charges for special services.

These economies and increased revenue have permitted us to prepare a balanced budget for the coming year. Studies to resolve some of our deep-seated financial problems are well in hand. Every effort is being made to manage the Society on a sound, conservative basis that will make it possible to preserve our security and to expand our services in the future.

### Plans for the Future

The planning program was initiated in 1959 by President Lorig and has been carried out by the Long Range Planning Committee under its Chairman, Carl E. Swartz.

It was reaffirmed that our primary goals are fostering education, advancing knowledge and disseminating information. It was considered that the Society should preserve its broad technical character in order to serve a wide spectrum of membership representative of the whole metal industry. It was also felt that implementation of the objectives in a wholesome manner required much greater member participation through national committee and chapter activities, as well as greater member representation in the industry.

The industry obviously needs more men and more capable men, better educated and trained. It needs more technical knowledge from research and better coordination and dissemination of information—technical, economic, and social. It needs more communication of technical information in meetings and conferences in the locality of the people who must use the information.

The Society can, and should, satisfy these needs as a responsible and comprehensive service to the national economy. The Society may ultimately serve 100,000 members composed of scientists, salesmen, managers, metallurgists, technicians and engineers of every technological race, color and creed, including representatives of splinter disciplines and industries not now recognized. They will be distributed widely in chapters that will increasingly carry a greater responsibility for educating, training and informing local members.

### Activities for the Future

The planning program has been augmented by special studies in the Scope Committee, R. F. Thomson, Chairman, the Publications Policy Study Committee, R. J. Raudebaugh, Chairman, and staff.

In education and career promotion, we have the primary objective of attracting the highest quality men and improving the education and training, both formal and informal, of all who serve the industry. We also recognize as areas of great need technician training, adult and refresher education, chapter educational courses and extension courses in metallurgy. Our policy is to foster these objectives primarily by utilizing the member resources of the Society and we expect to cooperate with other interested societies and agencies rather than to attempt unilateral programs.

As the availability of funds permit, it is also anticipated that the Society will prepare career promotional and educational material in the form of publications, movies, television programs, etc. The Chapter Educational Trust Fund, which is

a vehicle for assembling gifts for scholarships, will provide a new opportunity for chapters to make strong local efforts to encourage students to study metallurgy.

In the field of dissemination of information, our main efforts currently are being directed toward the achievement of more effective coordination of knowledge from many sources and channeling of engineering information to the development and production engineers, who need and can utilize the integrated information. It is planned that national engineering programs should be greatly expanded and increasingly directed toward regional conferences and chapter meetings. Special studies are being made to improve the quality of regional conferences and to make them more educational with exhibitions of manufacturers' products.

The Metals Engineering Program Committee has been enlarged and reactivated under the direction of its 1959-60 Chairman, George Kappelt, and Secretary T. C. DuMond. Plans are under consideration to expand the scope of engineering programs to include process metallurgy, physical metallurgy and properties of metals. It is also visualized that many subcommittees with specialized interest will be created to embrace the technical resources of the Society, and thus greatly augment our engineering programs.

The Publication Policy Study Committee, which is composed of staff and member representatives, has been engaged in a survey of the publication needs of the members and the publication media of the Society. Rapid and orderly publication of engineering programs will be accomplished by a quarterly periodical to be inaugurated early in 1961. Quarterly publication of Transactions papers is under consideration. A need for more current technical, economic and professional news has been recognized and the editorial scope of *Metals Review* is being broadened.

The scope of our interest in nonmetallic materials has been given special consideration by the Scope Committee. The subject is still under judgment, but the consensus is that drastic enlargement of scope would be undesirable, because of major problems, such as divisionalization, chapter reorganization, publication dislocations and infringement on other societies. A more acceptable policy appears to be gradual extension of programs and publications into areas of "non-metals that can sometimes be used as substitutes for metals, or can augment the use of metals, in engineering structures".

### Committee Organizational Structure

Recognition of our objectives as tangible goals has made it desirable that committee activities be increased in order to utilize the great resources of talent that could be gained through greater member participation. As a result, dormant

committees have been reactivated, some committees have been enlarged and new committees have been formed. Great consideration was given to a more effective committee organizational structure to serve the needs of a wide spectrum of members with complex and ever-growing and changing interests. It would have to be flexible, so that special committees and subcommittees could be added readily. It should be capable of tapping the specialized member resources of the Society and making them useful to all of the members without the undesirable features of divisionalization.

As a result of this consideration, the Technical Council was created to give technical committees more guidance and support than can be devoted to them by the Board of Trustees. Although it is still in a formative stage, the Technical Council, under George A. Fisher, Chairman, is accepting its responsibilities seriously and is showing constructive leadership in making the technical committees a more vital force in accomplishing our objectives.

The Board of Trustees recognized that an amendment to the Constitution would be necessary to confirm the status of the Technical Council. However, in order to correct any defects in the plan, the Board of Trustees decided to initiate the Technical Council prior to freezing it into permanent form. Meanwhile, the letter of the Constitution is being preserved by ratification by the Board of Trustees of acts of the Technical Council.

The Chapter Advisory Committee was formed in order to help the chapters to improve their activities and to give chapters a more expressive voice in the national affairs of the Society. The Committee, under Muir L. Frey, Chairman for 1959-60, has many facets of chapter operation under study and has taken an active part in the meeting of Chapter Chairmen on Monday of the Annual Meeting week. It is anticipated that the Committee will establish a subcommittee structure classified either by regional representation or by chapter functions.

In the area of educational and professional interests, the Advisory Committee on Metallurgical Education has been reactivated, and two new committees have been formed, the M.E.I. Advisory Committee, and the Development Committee. An accelerated effort on these educational problems would appear to be desirable. It is my personal hope that educational and professional committees will be strengthened by consolidation of their interests in an Educational Council, supplementing the Technical Council and proposed Chapter Council, in order to provide more effective leadership for committees in the three great areas of member participation in the work of the Society.

The willingness of a host of individuals and

their sponsoring companies to work through Society agencies for the general good of the industry has been convincingly demonstrated. During the current year over 200 members gave much of their time and skill to serving the Society on committees, and an even greater number helped to write the Handbook. This effort was more than matched by an inspired staff who worked long hours, nights and weekends to revitalize our activities.

In the enlargement of member participation in committees, the resulting influence on the staff activities has always been considered carefully. A major part of the success of the Society has depended on a strong and creative staff. Care is being taken to differentiate primary responsibilities for policy, administration and execution among the Board of Trustees, the Managing Director, staff associates and committees in order to preserve clarity of individual purpose and self-reliance within a defined scope of activity. It is expected that the expanded activity resulting from these plans will result in enlarged opportunities for creative initiative and personal achievement, as well as a higher degree of security, for our staff associates.

The Board of Trustees and I were benefited by the counsel and committee work of many of the Past Presidents and former Trustees. Special acknowledgement is due for the stimulating participation by Zay Jeffries, J. B. Austin and G. A. Roberts in a seminar on the future of ASM that was held for the benefit of the Board of Trustees and senior staff associates.

Our vision of the future was best expressed at that meeting by Ernest E. Thum, Editor-in-Chief of *Metal Progress* and Honorary Member of the Society, as follows:

"I will summarize by saying that the ASM is a part of an expanding universe. It will expand enormously in many directions—in the service of mankind, in membership, in the collection of vital information about all aspects of metals and metal-like substances, in its dissemination so that he who runs may read. Furthermore, I would remind you that the entire field of knowledge about metals and metal-like substances is relatively unexplored. It might be compared with our knowledge of electricity and its capabilities at the turn of the century, 60 years ago. Pursuing that analogy, I would say that, metallurgically speaking, we are now, today, in the era of the direct-current dynamo and the carbon filament lamp—and in the year 2000 we will be as far ahead as transistors, thermo-electric conversion, and radar bounced back from the moon".

These visions, plans and actions directed toward an expanding usefulness for the Society will materialize as members and staff associates accept the responsibility.



## REPORT OF THE SECRETARY

Walter E. Jominy  
Secretary, 1958-60



It is the task of the Secretary to chronicle the vital statistics of certain of the Society's activity, and to give a clear image of where the Society stands at a given moment in its progress through time. Not only does this insure continuity of our records, but it also provides an opportunity for lively awareness of the strength and vitality of our wonderful Society.

### Membership

The American Society for Metals, on Oct. 1, 1960, had a total membership of 31,854, a gain of 1486 members since last October. Of this number 27,180 are regular members, 1904 are student members, 2605 are sustaining members and 165 are honorary and life members. The increase of membership this past year is nearly 5%, compared with less than 1% gain during the previous year.

### Chapters

There are now 115 chapters in the Society, a gain since the last annual meeting of six chapters. It is with sincere pleasure that we have welcomed these chapters into the Society with official charters: Beaver Valley, Bonnevill, Orlando, University of Oklahoma, Upper Ohio Valley and Central Ontario.

It is indeed interesting to note that ASM members will be found in more than 50 countries of the world. The services of the Society are truly international.

### Board of Trustees

Your Board of Trustees has been particularly diligent and attentive to the affairs of the Society during this past year. During that period it has had the following meetings:

Nov. 4, 1959	Hotel Sherman, Chicago
Dec. 21-22, 1959	Metals Park
May 10-12, 1960	Hotel Sheraton, Dallas
June 23-25, 1960	Metals Park
Sept. 11-13, 1960	Metals Park

In addition to this meeting schedule, the Board members have individually visited 103 chapters. Such visits help the Board to be constantly sensitive to the needs of the members and the chapters.

The Board of Trustees currently has a number of ad hoc committees studying special situations, which has required the participation of Board members. In addition, individual board representatives have participated in meetings of the standing and other Society committees.

### Technical Council

A new group that has come into being through action of the Board of Trustees is the Technical Council. The purpose of the Technical Council is to foster the technical objectives of the Society by supervising and coordinating the activities of the Society's various technical committees. The council is concerned with programs, publications, technical development and chapter activities.

### Standing and Other Committees

Aside from the Board of Trustees and the Technical Council, 284 ASM members are giving their time and energy in the service of ASM through participation in regular committee work. This is in addition to the nearly 1300 individuals who have or who are participating on the Handbook subcommittees and other special purpose committees. The names of the members of each of these committees will be published in that volume of Transactions which reports the 1960 Annual Meeting.

Collectively these regular committees held a total of more than 35 meetings during this past year. The able and willing participation of the committee members in each of these meetings is gratifying and the total membership of ASM is indebted to them.

### Congresses and Meetings

**National Metal Congress**—At the close of the 1960 National Metal Congress, American Society for Metals and its seven participating societies can reflect on the most comprehensive series of technical sessions in 42 years. ASM's own Transactions sessions, Metals Engineering Conference and Seminar alone count for 104 technical papers. In addition, ten papers were presented in the Society's joint conference with the Atomic Energy Commission on "Nonoxide Compounds for Nuclear Fuels".

ASM also welcomed the splendid participation of Industrial Heating Equipment Association, Metals Treating Institute, Ultrasonic Manufacturers Association, Metal Powder Industries Federation and Metals Division of the Special Libraries Association in presentation of an additional 18 papers. SLA also offered a special course in ASM's Metals Engineering Institute on Friday

and Saturday, stressing basic metals information needed by special librarians.

Metallurgical Society of American Institute of Mining, Metallurgical and Petroleum Engineers presented nearly 100 full papers, plus a number of brief abstract sessions. When you add Society for Nondestructive Testing's 42 papers, you emerge with an unparalleled forum of ideas and information on metals science and engineering. American Society for Testing Materials also held committee meetings during the week of the Metal Congress for added impact.

A new feature of the Metal Congress this year, well worth mentioning, was the "Symposium for Steel Users" at Trade and Convention Center, with its important sessions on stainless steels, toolsteels and joining high-strength steels. As a technical unit, the 1960 Metal Congress, besides containing the greatest number of papers in its history, is certainly a most complete account of the year's progress in metals.

The Metals Division of Special Libraries Association held its 11th Fall Meeting in conjunction with the National Metal Congress and Exposition.

**Southwestern Metal Congress**—A successful Southwestern Metal Congress took place in Dallas, Tex., May 1 to 5, 1960, at which about 25 technical papers were presented. The Society for Nondestructive Testing cooperated with the Congress by also holding technical sessions at that meeting.

**Regional Meetings**—The Society can take pride in the regional and special technical meetings that have taken place in various locations during the past year through the efforts of a number of chapters.

**Educational Activities**—The Society continues its intense interest in education in all directions. As a matter of fact, the total activities of the Society are directed toward educational goals, whether in the areas of congresses, exhibits, publications, educational courses, or many of its other activities. However, there are several that are specifically mentioned here not elsewhere reported.

**Visiting Lectureship Program**—Under this program, the ASM pays the traveling expenses of lecturers needed by accredited colleges and universities to supplement their usual courses. Request is made to ASM for such a contribution.

Thirteen lectures were arranged and paid for in the most recent school year.

**Metallographic Exhibit**—The 15th annual ASM Metallographic Exhibit is being held during the National Metal Exposition at the Philadelphia Trade and Convention Center. More than 253 entries have been received and prizes for Best in Class and Honorable Mention awarded in 14 classes.

The Grand Prize for Best in Show—The Francis F. Lucas Award for excellence in metallography—has been presented by the judges to Gordon C. Woodside. The subject is "Section of Heat Checked Unalloyed Gray Iron Permanent Mold".

This award of \$500, endowed by Adolph I. Buehler, was presented to the recipient at the annual awards luncheon on Oct. 18.

All prize-winning entries will again be assembled in a traveling exhibit for shipment to ASM chapters and engineering schools during the winter season.

**ASM Educational Films**—ASM films on metallurgical subjects continued to be in tremendous demand during the last 1959-60 chapter year. The four films presently in circulation were shown a total of 567 times. Despite additional new prints of certain of the films, the demand could not be met for showings before educational, government installations and miscellaneous groups.

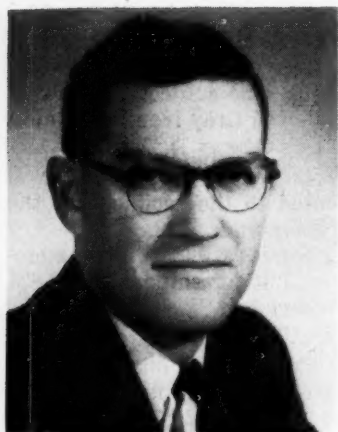
**Career Literature**—Awareness of and interest in metallurgy and metalworking as a career is being fostered by widespread distribution of literature describing metallurgy and metallurgical engineering. Three pieces of literature were revised and reprinted during the year. First, the article "Many Metallurgists Still Needed!", which originally appeared in *Metal Progress* several years ago, was updated statistically and again published, this time in *Metals Review*. Since its second publication, 2500 reprints have been distributed. More than 5000 copies of the revised brochure "Does Engineering Appeal to You?" have been sent to schools, individuals and to ASM chapters for local distribution. The 94-page book "Your Career in the Metallurgical Profession" was slightly revised during 1959-60 to present current salary information. Of 5000 copies printed, less than 1000 copies remain for further distribution.

### Concluding Comment

It has been my personal privilege as an ASM member for 40 years to have had the opportunity to witness the spectacular development of ASM, the most progressive technical, engineering and scientific society that I know. All signs indicate that our tempo of growth will continue apace in all directions, and that such vital growth will bring an even richer experience into the lives of each and every one of our members because of their ASM membership.

As I yield the pen of the Secretary to my successor, I do it with full knowledge that he will have the privilege of recording more eyewitness events of the ever-growing worth of your Society to all those who have such a great need of its service in the future.





## REPORT OF THE TREASURER

Robert J. Raudebaugh  
Treasurer, 1959-61

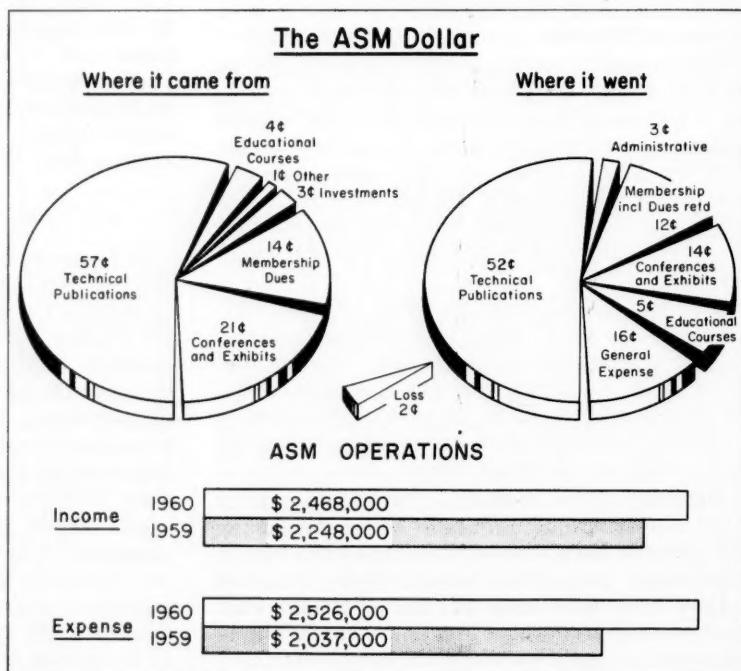
In presenting the Treasurer's report for the fiscal year ended Aug. 31, 1960, I feel it advisable to point out that this past fiscal year has been one of transition for the American Society for Metals. Final settlement was made on the new headquarters building. An expanded committee structure was put into operation. The Metal Show has been reconstituted. Improved methods of accounting were adopted. These factors and others to be referred to later in this report, plus the trend of the current economic situation, have resulted in the fact that ASM, for the first time in its long history, has not succeeded in meeting expenses in a given year. I point out the loss of \$58,000 early in my report to emphasize the fact that our Society can suffer reverses when the national economic trend is down. This loss is not one to be taken lightly. However, when considered in the light of the Society's expanding activities it is not alarming, and should be viewed as an investment in the future growth of the Society.

Let us illustrate where the ASM dollar came from and how it was used. The accompanying chart (entitled "The ASM Dollar") graphically illustrates that an important source of our income is from you, the members. It also shows that we must rely heavily on outside revenues to enable us to carry on our many activities.

It is interesting to note that 57% of our income and 52% of our expense came about in the field of Technical Publications. Since the most important way that we can communicate with you and serve you is through our publications, it is

significant that these figures are the largest in our dissection of the income and outgo dollar. The remainder of the income dollar is as follows: 21c from conferences and exhibits, 14c from membership dues, 4c from educational courses, 3c from investments, and 1c from other sources. The remainder of the outgo dollar was spent as follows: 3c for administrative, 12c for membership, 14c for conferences and exhibits, 5c for educational courses, and 16c for general expenses. All of this added together means that for the fiscal year ending Aug. 31, 1960, the expenses exceeded the income by 2c per dollar. It is noteworthy that \$148,000 of the membership dues was returned to the chapters for local service to members, and also noteworthy is that dues are the same today as they have been during the entire history of the Society.

Let us consider this loss. As we look at the bar graph (entitled "ASM Operations") we can see that income rose in 1960 vs. 1959, but that expenses rose in a greater proportion. Again, this follows the trend of the general economic condition of our nation. It has been much more difficult to obtain the income dollar; more money has had to be spent in obtaining it. We have had increased costs in the Membership Department. *Metal Progress* has been improved editorially, which should ultimately result in increased revenues. The Metals Shows have required more promotional effort so that we might continue to function regionally and so that we might reconstitute ourselves nationally. MEI is growing, but still had to be subsidized. The Board of Trustees held more meetings and its members visited



more chapters. Administrative costs rose, and the new headquarters, though no luxury, does cost more to operate.

In some of our departments we have been able to reduce costs. *Review of Metal Literature*, technical books and Transactions have shown an improved performance during this past year.

The transition of which I spoke earlier has been in the reshaping of the affairs of the Society. An expanded committee structure, aimed at broadening member participation in the affairs of the Society, was put into operation. More conservative and realistic methods of accounting have been instituted. Historically the Society has not put much emphasis on depreciation of real property nor on obsolescence of inventories. In addition, gains on the sale of securities in the past have been included as operating income. We could have reported a gain for Fiscal 1960 by treating the operations in this manner. However, we feel that to be realistic we must recognize the above mentioned items, and therefore have taken a "business" approach to our accounting. This has resulted in our reported loss, but permits a more realistic evaluation of our situation. The Board of Trustees feels that all of this is vital to our future.

No treasurer's report is complete without an examination of the balance sheet. In bar graph form, our balance sheet at Aug. 31, 1960, is shown as compared with Aug. 31, 1959. Our total assets, and consequently liabilities, reserves and net worth have increased. The largest increase came about through the completion of the building and our borrowing money from the bank for the completion. 69% of the Society's assets are fixed in property such as the headquarters building, inventory, etc. 31% of the assets are liquid, but are no more than adequate for contingencies and the future needs of the Society. Since the Society has a continuing need for capital to sustain and improve member services, we must continue to conserve assets so that future growth might be maintained.

Due to a change in our accounting procedures, there are no appropriations, as such, to report this year. However, the historical educational activities that have been financed in the past by this means will be carried on in the fiscal year of 1961 by charging the expenditures to current expense as incurred.

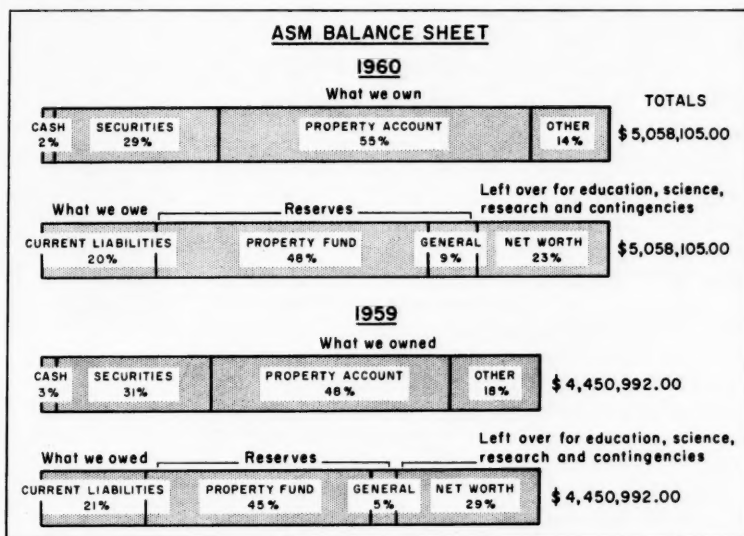
A few of these are: revision of current editions of Metals Handbook, research and development in connection with ASM Documentation

Service, chapter educational activities, aid to *Acta Metallurgica*, teaching award and visiting lectureships.

This change in accounting procedure has been effected so that a more realistic recognition of costs might be made. We will then be able to analyze each service of the Society individually, with the goal being that each service can become more nearly self-liquidating.

The complete balance sheet and statement of income and expenses have been audited by Ernst & Ernst, certified public accountants, and their report is shown on an adjacent page.

As the President indicated in his report, certain steps have been or soon will be taken to provide increased income. These, augmented by careful curtailment of expenditures, have resulted in what appears to be a conservative estimate of excess income over expenses for fiscal 1961. By virtue of this we face the future with plans for greater coverage in membership and greater service to members, including an expanded publication effort and adequate provision of reserves for future expansion.



I should like to point with pride, at this time, to the fact that our beautiful new headquarters building has been paid for with Society funds, with no solicitation or contributions from members nor from any outside sources. This is an unprecedented achievement in technical society operations.

I would be remiss if I did not acknowledge with gratitude the assistance rendered in the past year by the Finance Committee, by President Crafts, the Board of Trustees and the Managing Director. Many of you are probably aware of the fact that Al Hess, ASM's amiable and very able Assistant Treasurer, has recently retired.

# BALANCE SHEET AMERICAN SOCIETY FOR METALS

August 31, 1960

ASSETS		
CASH		
ACCOUNTS RECEIVABLE		
Scientific and engineering conferences and exhibits:		
National—Philadelphia—October, 1960	\$ 72,867.25	
Regional—Los Angeles—March, 1961	95,252.00	
Advertising and miscellaneous accounts		
Less allowance for doubtful accounts		
INVENTORIES—at cost or lower		
Bound and unbound books, publications, and correspondence		
courses, etc.		
OTHER ASSETS		
Miscellaneous deposits and employee accounts		
Due from Property Fund		
SECURITIES		
Investment cash—agency account		
Bonds, stocks, and land trust certificates—at cost (approximate		
market \$1,732,918.57)—Note A		
Accounts receivable		
PROPERTY FUND		
Cash		
Land	\$ 30,000.00	
Building—at cost less allowance for depreciation	2,522,652.75	
Furniture and equipment—at cost less allowances for deprecia-		
tion		
Idle facilities—at cost less allowances for depreciation—Note	166,809.07	
A	44,250.00	
DEFERRED CHARGES		
Prepaid expenses for scientific and engineering conferences and		
exhibits		
National—Philadelphia—October, 1960		
Regional—Los Angeles—March, 1961		
Development costs applicable to correspondence courses		
Prepaid insurance		
Equipment for technical conferences—at cost less allowance		
for depreciation		
Miscellaneous		

LIABILITIES		
Accounts payable:		
for purchases and expenses		\$ 68,314.61
for salaries and wages		18,038.48
For apportionment of dues to local chapters		6,636.65
		\$ 87,984.74
Special contributions:		
A.S.M. of Tomorrow		\$ 12,525.00
W. H. Eisenman Memorial Fund		5,000.00
W. H. Eisenman Rare Book Fund		5,796.25
		\$ 23,321.25
DEFERRED INCOME		
Scientific and engineering conferences and exhibits:		
National—Philadelphia—October, 1960		\$ 412,244.00
Regional—Los Angeles—March, 1961		167,110.00
		\$ 579,354.00
RESERVE		
For educational objectives—Note B		\$ 233,052.93
For scientific and engineering conferences		17,000.00
For Metals Handbook		60,000.00
Campbell Memorial Lecture Fund		50,223.66
H. M. Howe Medal Fund		15,000.00
Sauveur Achievement Award		5,000.00
		\$ 443,276.59
PROPERTY FUND		
Note payable to bank—Note A		\$ 350,000.00
Amount due contractor		12,500.00
Amount due operating funds		6,672.01
		\$ 369,172.01
Reserve—Note B		
		2,400,750.12
		\$ 2,769,922.13
NET WORTH		
Balance at September 1, 1959		\$1,302,608.57
Deduct:		
Net loss from operations for the year		\$ 58,207.44
Cash value of life insurance and insurance certificates for		
employee retirement		90,154.81
		148,362.25
		\$ 1,154,246.32
		\$ 5,058,105.03

See notes to financial statements.

## STATEMENT OF INCOME AND EXPENSES

Membership	\$ 207,268.04
Technical and engineering reference publications	1,500,936.93
Scientific and engineering conferences and exhibits	553,788.48
Documentation service—Institute	5,483.43
Metals Engineering Institute	107,831.73
Interest and dividends earned	72,721.78
Technical and educational materials	12,416.14
Discount earned	2,081.24
TOTAL	\$ 2,467,733.69
EXPENSES	
Membership and chapter service	\$ 155,329.57
Technical periodical and reference publications	1,373,135.32
Scientific and engineering conferences and exhibits	357,064.85
Documentation service	7,349.96

Metals Engineering Institute	120,900.66
Interest expense	18,276.76
Technical and educational materials	3,787.31
General expenses	235,259.78
Headquarters building operations	104,421.65
Financial and administrative	104,421.65
Managing Director's Office	38,967.26
Board of Trustees	38,080.79
National committees	20,775.55
Library, awards, and lectures	5,709.01

TOTAL EXPENSES	\$ 2,525,941.13
NET LOSS FROM OPERATIONS—Notes B and C	\$ 58,207.44

See notes to financial statements.

## NOTES TO FINANCIAL STATEMENTS

Note A—Securities and idle facilities at 7335 Euclid Avenue, Cleveland, Ohio, are pledged as collateral for a demand note payable to bank in the amount of \$350,000 with interest at 5%.

Note B—In addition to the amount of \$1,302,608.57, the balance sheet reflects the net worth of the American Society for Metals at August 31, 1960, and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

premium on bonds purchased, credited to a reserve for educational objectives. No part of the excess of proceeds from the sale of securities was included in the statement of income and expenses.

Note C—In addition to expenses charged to operations for the year, the statement of income and expenses for 1960 shows expenditures in the amount of \$151,035.52 were made during the year from prior years appropriations. Such expenditures are shown in the accompanying statement of appropriated income.

Board of Trustees

American Society for Metals

Novelty, Ohio

We have examined the balance sheet of American Society for Metals as of August 31, 1960, and the related statements of income and expenses and net worth for the year then ended. Our examination was made in accordance with the auditing standards and principles generally accepted by the Institute of Certified Public Accountants. In our opinion, the accompanying balance sheet and statement of income and expenses present fairly the financial position of American Society for Metals at August 31, 1960, and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Cleveland, Ohio

September 29, 1960

Ernst & Ernst

Certified Public Accountants



I say that many of you may be aware of this but only the relatively few of you who have worked closely with Al can really appreciate how much he will be missed.

To offset this loss, ASM is indeed fortunate in having the continued services of Burley White, who understudied Al and who has taken over as Assistant Treasurer. Furthermore, it is indeed timely that Mr. Putnam has seen fit to establish the office of Controller on the ASM staff and to have had the good fortune of securing Al Lloyd for this position. I, for one, look forward to a year of pleasant association with these men in ASM.

## REPORT OF THE MANAGING DIRECTOR

A. R. Putnam  
Managing Director



President Crafts has presented a highly informative and cohesive picture of the state of Society affairs, as have the Secretary and the Treasurer. This makes the task of the Managing Director infinitely more simple. The published version of this report in Transactions will present somewhat more statistical data than presented herein, but I would like to mention briefly several areas of activity of the Society that are of common interest to us all.

### Chapter and Member Activity

That the Individual member of ASM is the keystone to the Society is axiomatic. Regardless of the service to the general areas of industry, education and government, the communication of knowledge must resolve itself as an individual piece of communication. It is always with the individual member in mind that ASM has in the past and will unquestionably continue to plan and provide its services.

## STATEMENT OF APPROPRIATED INCOME AMERICAN SOCIETY FOR METALS

Year ended August 31, 1960

### INCOME APPROPRIATED FOR PROPERTY FUND

Balance September 1, 1959	\$191,959.85
Add amount transferred from Income Appropriated for Educational Purposes	10,477.88
	<u>\$202,437.73</u>
Less amount transferred to Property Fund	202,437.73

BALANCE AUGUST 31, 1960 \$

### INCOME APPROPRIATED FOR EDUCATIONAL PURPOSES

Balance September 1, 1959	\$161,513.40
Less expenditures during year:	
Revision of Metals Handbook	\$ 86,000.00
Mechanical literature searching	22,820.00
Science award program	20,000.00
Chapter educational courses	7,800.00
A.S.M. Foundation for Education and Research	5,000.00
Visiting lectureships	3,397.84
Acta Metallurgica	3,360.00
Teaching awards	2,157.68
National Federation of Science Abstracting and Indexing Services	500.00
	<u>151,035.52</u>
	\$ 10,477.88
Less amount transferred to Income Appropriated for Property Fund	10,477.88

BALANCE AUGUST 31, 1960 \$

The chapter is a unit of individuals, and therefore a "group of keystones". I have been impressed during my travels this past year with the very apparent vigor of the chapters in their services for individual members. The vitality of the chapters in the areas of program, educational and fellowship activities is commendable.

To be of further assistance for chapter activities, the Chapter Advisory Committee has come into existence and is devoting study to those matters of prime importance to chapters. One of its current projects is the preparation of a Chapter Operation Manual that will be of immense value to newly formed chapters, and, I suspect, of not insignificant value to chapters that have been operating many years.

ASM's Director of Membership and Chapter Relations, Ted DuMond, will visit with the executive committees of over 80 chapters this year. Officers and trustees will also visit a considerable number of chapters.

Last year at the Metal Congress in Chicago a Chapter Chairmen's Dinner was attended by 80 chapter representatives. At this present Metal Congress, a somewhat expanded Conference and Dinner for the Chapter Chairmen was attended by 75 chapter representatives. New feature of this year's conference was a 2-hr. session for individual discussions and another 2-hr. session for "clinics" where chapter representatives explored with each other chapter problems of common interest: program planning, meeting attendance, chapter finances and educational programs. These clinics were ably conducted by members of the Chapter Advisory Committee, and the participation of the chapter representatives was indeed heartwarming.

Your Secretary has reported that ASM has had growth within this past year. The chapters are now engaged in an interesting effort which

will last from now until next May, to recognize where there may be gaps in the membership in terms of technical and other interests. The result of this effort will be to bring the technically nourishing services of ASM to those who need them, and to bring those who have contributions for our total knowledge to ASM. This planned growth will benefit all members.

### Periodical and Reference Publications

I share with the membership of the Society the enthusiasm for the Society's publishing program, with respect to both periodical and reference publications. *Metal Progress* is without peer. The new look of *Metals Review* will be more readily apparent to you as the months go by. *Review of Metal Literature* continues its superb job of serving the need for abstracts of the metallurgical literature. Technical books of importance will become newly available to the membership during the coming year.

But there are three developments upon which I wish to comment specifically. The first is one that has been eagerly awaited by the membership, and, indeed, industry and education generally. This is Volume I of the new Metals Handbook, entitled "Selection and Properties of Metals". You are going to be proud of this publication. All present regular members of the Society in the United States and Canada will receive their copies without charge, and without any requirement of returning the 1948 edition of the Handbook. New members joining after Dec. 31, 1960, will be entitled to purchase one copy of the volume at \$10. Price to nonmembers is \$30.

Second, during the next two years the Society expects to prepare a series of six monographs on metals as related to nuclear energy, at the request of the Atomic Energy Commission. They will be published through that Commission, and will do much to advance knowledge on this important subject.

Third, your Board of Trustees has authorized the creation of a new quarterly publication which will contain selected papers from the ASM Metals Engineering program from National Metal Congresses, and selected papers from Regional Metal Congresses and other regional meetings. The need for this publication has been long felt. Papers from such engineering sessions will be made more quickly available, and at less cost than if published in the form of bound books. The subscription price of this new service will be \$6 per year. Announcements about this new quarterly publication are currently in circulation.

### Education and Career Guidance

Although all activities of the Society are educational in nature, one of the most direct expressions of the Society's activity in this area is that

of the Metals Engineering Institute, the home study division of the Society. Courses in the Institute are given through individual home study, chapter or industrial groups. During the past financial year, 1829 students were enrolled, bringing the grand total of present and past students in MEI to 3788. The 1959-60 registration is approximately equal to the total number of enrollments during the three previous years of MEI's existence as an operating school.

Presently there are 21 courses offered through the school. Three new courses will be added as soon as possible. They are: Material Selection; Aluminum and Its Alloys; Powder Metallurgy. Two new courses that have been added to the curriculum recently are: Principles of Machining and Corrosion.

Chapters are making important uses of these MEI courses. Also, chapters are continuing to do a splendid job of conducting educational lecture series of various types, and are thus serving their industrial communities in a significant manner.

In the area of career guidance, we must also point out the vigor with which chapters have been participating in Science Fairs and similar events within their own community areas. It is evident that if young men and women are to be encouraged to enter the field of metallurgy, they must acquire their interest early. Too often we hear of college students finding out what metallurgy is, and learn that it has appeal to them, after their course of study has been committed.

For eight years the American Society for Metals has conducted, through the National Science Teachers Association, awards for junior and senior high school students on a national basis. Over 6300 entries were received this past year. These have been known as the Science Achievement Awards. They have appealed to all segments of science and engineering interests of students. Over the years ASM has appropriated over \$120,000 for this career guidance effort that has benefited many disciplines. This coming year the awards are being carried on, with some assistance by ASM, largely by the NSTA, and will be known as the Future Scientists of America Awards. Meantime ASM is leading a movement among a broad spectrum of the technical and scientific societies, including those in the life sciences, to assure the continuation and expansion of these awards after this year.

### Documentation and Information Searching

ASM has been truly a pioneer in its efforts to make the fruits of research and other work readily available to those about to launch studies in related areas. The abstracting and encoding of the metallurgical literature, and the placing of this data on magnetic tape, makes the knowledge of the world in our field readily accessible to those



with specific problems.

The information searching service is an outgrowth of five years of experiment and development sponsored by the American Society for Metals at Western Reserve University. Searching services are now being performed by Western Reserve under contract to ASM.

Formerly done on the experimental searching selector at Western Reserve University, searching is currently being done on a GE-304 computer. The General Electric Co. is building a commercial high-speed computer for the ASM-WRU system at Western Reserve University, delivery of this equipment due for February 1961. Other standard commercial computers of various makes are also being programmed to perform searches of the ASM encoded tapes.

Material is being encoded for machine search at Western Reserve at the rate of about 3000 documents per month during 1960—approximately 35,000 per year. Of these 35,000, 12,000 are being prepared under contract to ASM. The other 23,000 are being financed at WRU as part of a test program sponsored by the National Science Foundation. All of the abstracts prepared in this test program are being made available to the ASM "Machine Library" for use in its searching service.

ASM's active leadership in machine search of the literature can be the instrument that will minimize the duplication of research in annual figures of millions of dollars.

### Metal Shows

The 1960 Metal Show cannot be passed by without a brief word. The exposition in Philadelphia this year had an important "new look", one that was apparent as soon as one visited the show. The emphasis is on metals and materials. The types of exhibits admitted to the show were restricted to 12 categories: ferrous metals; non-ferrous metals; related engineering materials; nuclear materials; tool materials; cutting-off and forming; industrial heating; cleaning and finishing; welding and joining; testing, inspection, control equipment and research services; metals production and casting equipment and supplies; parts, forms and shapes for design and applications; associations, societies and publishers.

Eliminated from the show are 20,000 sq.ft. of machine tools and certain other industrial equipment not particularly related to the type of educational exposition that can best serve the ASM member. Welcomed back into the show were some metal producers who have been absent for as much as 20 years. The Steel Arena is an exciting three-dimensional educational experience. Other new features of the show included convenient "Informa-Badges" for easy inquiry recording at each exhibit, and the display of category sym-

bols at each exhibit "indexing" the show for the visitor.

Since the first Metal Show was held in Philadelphia 40 years ago—in 1920—it is appropriate that the Metal Show rededicated itself to its great purpose in this city once again.

### Tribute to Staff

The membership can be justifiably proud of its fine, hard-working staff. At the 1960 Annual Meeting it was my particular privilege, on behalf of the membership and the Board of Trustees, to recognize long-term service of the following persons, each of whom have been associated with the Society's staff for 25 years or more:

Evelyn G. Gardner, Secretary to the Board of Trustees

Ernest E. Thum, Editor-in-Chief, *Metal Progress*  
Marjorie R. Hyslop, Managing Editor, *Metal Progress*, and Editor, *Review of Metal Literature*

Chester L. Wells, Exposition Manager

A. P. Ford, Manager of Communications

### Tribute to Officers and Trustees

I take the privilege of expressing on behalf of all the members to your Officers and Trustees the tremendous debt of gratitude which they are due for sacrificial hours, unlimited energy and a devotion to the cause and work of the Society that brings bountiful benefits to all members. These men serve with such constancy because they, as you, believe in ASM.

Walter Crafts was the first ASM president under which I served an entire year, although he is the 14th president under whom I have served in some capacity since entering Society work. I can say without qualification that he is a person of tremendous vision. He constantly prods the Board of Trustees with this question: "How will today's decision look five or ten years from now?" This is a question which brings perspective to any issue. ASM is much the richer because of Walter Crafts. We are all indebted to him for his indefatigable devotion to the serious duties which ASM imposed on him during the terms of his vice-presidency and presidency.

**OPERATION CRYOGENICS**—As part of a program to demonstrate the ability of 9% nickel steel to handle liquified gases of temperatures as low as  $-320^{\circ}\text{F}$ ., the rectangular vessel shown on the cover was filled with liquid nitrogen and repeatedly struck with a 4340-lb. wrecking ball. When failure occurred it was in the form of a ductile rupture in one corner of the vessel. The cooperative testing program and demonstration was carried out by the U.S. Steel Corp., Chicago Bridge & Iron Co., and The International Nickel Co.



## APPOINTMENTS TO ASM STANDING COMMITTEES

At the meeting of the Board of Trustees of the American Society for Metals held October 21, 1960, appointments to various national committees of the Society were announced by President-Elect Pennington and confirmed by the Board. The complete personnel of the standing committees is listed below. The new appointments are shown in *italics* and the numerals represent the date of expiration of the appointment. Chapter affiliations are listed rather than employment addresses.

### TECHNICAL COUNCIL

George A. Fisher, Jr., International Nickel Co., Dayton, '61, Chairman.  
George H. Enzian, Metal Research Div., Jones & Laughlin Steel Corp., Pittsburgh, '61.  
E. M. Mahla, E. I. duPont deNemours & Co., Wilmington, '61.  
R. M. Parke, Research Lab., General Electric Co., Eastern New York, '61.  
W. C. Schulte, Curtiss-Wright Corp., New Jersey, '61.  
S. G. Fletcher, Latrobe Steel Co., Pittsburgh, '62.  
R. H. Gassner, Douglas Aircraft Co., Los Angeles, '62.  
J. Harry Jackson, Battelle Memorial Institute, Columbus, '62.  
A. R. Troiano, Case Institute of Technology, Cleveland, '62.  
*A. Bornemann, Stevens Institute of Technology, New Jersey, '63.*  
*D. J. Carney, U.S. Steel Corp., Pittsburgh, '63.*  
*R. D. Chapman, Chrysler Corp., Detroit, '63.*  
*H. H. Yates, McGill University, Montreal, '63.*  
Carl Swartz, Board Representative.  
Allan Ray Putnam, Managing Director.

### TRANSACTIONS COMMITTEE

T. E. Leontis, Dow Chemical Co., Saginaw Valley, '61, Chairman.  
Ray W. Guard, General Electric Co., Eastern New York, '61, Past Chairman.  
P. D. Frost, Battelle Memorial Institute, Columbus, '61.  
Sol Gertsman, Physical Metallurgy Div., Dept. of Mines & Technical Surveys, Ottawa Valley, '61.  
David Krashes, Worcester Polytechnic Institute, Worcester, '61.  
Sidney Poole, Republic Steel Corp., Canton-Massillon, '61.

Gerold H. Tenney, Los Alamos Scientific Lab., Los Alamos, '61.  
William R. Upthegrove, University of Oklahoma, Tulsa, '61.  
Donald J. Blickwede, Bethlehem Steel Co., Lehigh Valley, '62.  
R. B. Boswell, Chrysler Corp., Detroit, '62.  
T. W. Eichelberger, Westinghouse Electric Corp., Pittsburgh, '62.  
J. C. Hamaker, Jr., Vanadium-Alloys Steel Co., Pittsburgh, '62.  
R. F. Hehemann, Case Institute of Technology, Cleveland, '62.  
Henri P. Tardif, Canadian Armament Research & Development Establishment, Quebec, '62.  
*Wilton F. Melhorn, Tube Turns, Inc., Louisville, '63.*  
*L. J. Haga, State Heat Treat, Inc., West Michigan, '63.*  
*Francis M. Krill, Kaiser Aluminum & Chemical Corp., Inland Empire, '63.*  
*J. T. McCormack, Clemson College, Old South, '63.*  
*W. P. Roe, American Smelting & Refining Co., New Jersey, '63.*  
*Samuel J. Rosenberg, National Bureau of Standards, Washington, '63.*  
T. C. DuMond, Secretary.  
George H. Enzian, Technical Council Representative.  
A. R. Troiano, Technical Council Alternate.  
Albert R. Fairchild, Board Representative.

### SEMINAR COMMITTEE

Julius Harwood, Metallurgy Dept., Ford Motor Co., Detroit, '61, Chairman.  
F. L. Vogel, R.C.A. Semiconductor & Materials Div., Philadelphia, '61, Past Chairman.  
W. A. Backofen, Massachusetts Institute of Technology, Boston, '61.  
T. H. Blewitt, Oak Ridge National Laboratory, '61.  
Morris Fine, Northwestern University, Chicago, '61.  
D. S. Wood, California Institute of Technology, Los Angeles, '61.  
E. Epremian, Union Carbide Metals Co., Buffalo, '62.  
A. Guy, University of Florida, Purdue, '62.  
E. Machlin, Columbia University, New York, '62.  
W. Rostoker, Armour Research Foundation, Chicago, '62.

*Franz Brotzen, Rice Institute, Texas, '63.*  
*W. C. Ellis, Bell Telephone Laboratories, '63.*  
*Raymond Smith, Michigan College of Mining & Technology, Philadelphia, '63.*  
*H. G. Wilsdorf, Franklin Institute Laboratories, '63.*  
 T. C. DuMond, Secretary.  
 A. R. Troiano, Technical Council Representative.  
 E. M. Mahla, Technical Council Alternate.  
 M. Cohen, Board Representative.

#### **CONSTITUTION AND BY-LAWS COMMITTEE**

Hallock C. Campbell, Arcos Corp., Philadelphia, '61, Chairman.  
 Ralph L. Wilson, Timken Roller Bearing Co., Canton-Massillon, '61, Past Chairman.  
*Clarence H. Lorig, Battelle Memorial Institute, Columbus, '61.*  
*George Dolch, Jr., Thompson-Ramo-Wooldridge, Inc., Cleveland, '61.*  
 Muir L. Frey, Allis-Chalmers Manufacturing Co., Milwaukee, '62.  
 Larry J. Huester, Consulting & Technical Services, Washington, '62.  
*Russell Brush, Eastman Kodak Co., Rochester, '63.*  
*Robert E. Pond, Johns Hopkins University, Baltimore, '63.*  
 Merrill Scheil, Board Representative.  
 Allan Ray Putnam, Managing Director.

#### **FINANCE COMMITTEE**

Zay Jeffries, General Electric Co., Honorary Chairman.  
 Robert J. Raudebaugh, International Nickel Co., National Treasurer, Chairman.  
 Ib Jensen, American Machine & Metals, Inc., '61.  
 C. H. Stevenson, Lindberg Engineering Co., Chicago, '61.  
 K. R. Van Horn, Aluminum Co. of America, Pittsburgh, '61.  
 Robert H. Aborn, U.S. Steel Corp., Pittsburgh, '62.  
 A. J. Herzig, Climax Molybdenum Co. of Michigan, Detroit, '62.  
 Wilson Trueblood, Leeds & Northrup Co., Milwaukee, '62.  
*Ernest Johnson, Republic Steel Corp., Cleveland, '63.*  
*Guido P. Palma, Bearium Metals Corp., Rochester, '63.*  
*A. J. Phillips, American Smelting & Refining Co., New Jersey, '63.*  
 Albert Lloyd, Controller, American Society for Metals.  
 Allan Ray Putnam, Managing Director  
 Burleson White, Assistant Treasurer, ASM

#### **METALS ENGINEERING PROGRAM COMMITTEE**

John Garol, Douglas Aircraft Co., Tulsa, '61, Chairman.  
 Robert Busk, Dow Chemical Co., Saginaw Valley, '61.

*Michael J. Mianulli, Titan Metal Mfg. Co., Penn State, '61.*  
 Thomas Piper, General Dynamics Corp., San Diego, '61.  
 W. E. Rinehart, Electrode Div., Harnischfeger Corp., Milwaukee, '61.  
 Mark Bowman, Jr., Phillips Petroleum Co., Tulsa, '62.  
 J. L. Everhart, International Nickel Co., New Jersey, '62.  
 W. H. Sparrow, Jr., Chance Vought Aircraft Corp., North Texas, '62.  
 R. D. Wylie, Babcock & Wilcox Co., Akron, '62.  
*H. A. Curwen, Earle M. Jorgenson Co., Los Angeles, '63.*  
*Andrew B. Johnson, Caterpillar Tractor Co., Sangamon Valley, '63.*  
*Robert Nichols, Earle M. Jorgensen Co., Golden Gate, '63.*  
*Louis J. Zadra, General American Transportation Corp., Calumet, '63.*  
 T. C. Dumond, Secretary.  
 R. D. Chapman, Technical Council Representative.  
 Robert Gassner, Technical Council Alternate.  
 Merrill Scheil, Board Representative.

#### **ADVISORY COMMITTEE ON METALLURGICAL EDUCATION**

Earl C. Roberts, University of Washington, Puget Sound, '61, Chairman.  
 H. W. Paxton, Carnegie Institute of Technology, Pittsburgh, '61, Past Chairman.  
 J. Edward Krauss, New York Community College, New York, '61.  
 Fred Westermann, University of Cincinnati, Cincinnati, '61.  
 Eric Wischhusen, James C. White Co., Oak Ridge, '61.  
 William Collins, United-Carr Fastener Corp., Boston, '62.  
 Glenn W. Geil, National Bureau of Standards, Washington, '62.  
 Robert Maddin, University of Pennsylvania, Philadelphia, '62.  
*Paul H. Anderson, South Dakota School of Mines & Technology, Rocky Mountain, '63.*  
*J. Robert Kattus, Southern Research Institute, Birmingham, '63.*  
*George Timmons, Climax Molybdenum Co., Detroit, '63.*  
 A. deS. Brasunas, Secretary.  
 R. M. Parke, Technical Council Representative.  
 H. H. Yates, Technical Council Alternate.  
 John Convey, Board Representative.  
 Walter Crafts, Foundation Representative.

#### **HANDBOOK COMMITTEE**

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**NEW YORK'S PAST CHAIRMEN'S NIGHT** (the November 14 meeting) was a happy occasion, with 14 of the chapter's past chairmen showing up for the festivities. Mingling old timers with chairmen of more recent vintage, the photographer came up with this smiling group: (Standing left to right): Les Seigle—1959, Frank Malone—1958, Harold Malm—1943, William Mudge—1946, H. C.

Bostwick—1935, John W. Sands—1939, Lud Anselmini, E. M. Sherwood—1949, William Kennelly—1957. (Seated left to right): Walter Stadler—1954, J. J. Preisler—1952, Tim Holden (perennial secretary), T. D. Parker—1948, Jim Vanick—1934. Unfortunately, the "oldest timer", Sam Tour (1923) showed up a little too late to be included in this photo.





## HOW 13 ASM STAFF ASSOCIATES SERVE THE MOST IMPORTANT PEOPLE IN METALWORKING —THE 32,642 MEMBERS OF ASM

Under the now-famous ASM Geodesic Dome in Geauga county, 23 miles east of Cleveland, 118 people are busily engaged in providing 32,642 members of American Society for Metals with all the educational services and technical publications of the Society.

None of these people work more closely with members than the 13 who comprise the ASM Membership Records department. To them, each member is Mr. ASM, treated accordingly. How can 13 people maintain contact with 32,642 members (as of Nov. 31, 1960) several times each month? The answer is organization, with a big helping hand from one of the latest types of electronic data processing systems. In operation for only a few months, the new system has enabled great improvements in efficiency and time-saving.

To put it another way, American Society for Metals exists to provide its members with a continuing flow of technical information in their fields of interest—metalworking's materials, processes and products. The Membership Records department keeps this information flowing.

### Keeping Track of Members—a Big Job

Speed and accuracy are two basic considerations of the department. To assure a member receiving the information he needs, when he needs it, his name and address must be correct and up-to-the-minute. According to B. Risdon Barber, department manager, address changes average between 600-700 per month. One out of every four ASM members changes his address each year! Add to this the burgeoning membership of the Society—an increase of more than 2000 members this past year alone—and you come up with a tremendous number of changes that must be made, quickly and accurately.

What does each change involve? If it's a change of address, it may be accompanied by a change in company and position. These changes necessitate a complete recoding of the member's IBM card, then printing and punching of a new card "set". And every one of ASM's 32,642 members requires 13 separate cards for a variety of record, invoicing and chapter purposes. For instance, new membership cards must be sent to the member and a record made for his chapter.

The original master card of each member, with every change that has been made in it, is kept as a part of the department's permanent historical file. This way, ASM has a complete record



**MEMBERSHIP RECORDS**—B. Risdon Barber, manager of the ASM Membership Records department, shows some of the many forms and records required to keep track of the Society's members. He holds the new membership card, one example of well over 1,000,000 pieces of mail processed by the department each year.

of a member's activity. Also the department maintains, by chapter, a comprehensive "cardineer" revolving card file, in which is recorded each member's complete history since joining the Society. This enables quick reference to any member and provides for a check against the IBM master cards.

### Monthly Reports to Chapters

A monthly report is prepared for each of the 115 ASM Chapters. Included are all dues payments, transfers, new and reinstated members and any other membership changes. Periodically, local chapters will request a listing of their membership to use as a check against their own records. Such lists are particularly useful to the Chapters when preparing new chapter rosters. This again points to the need for absolute accuracy in record keeping by the department. In addition, the department handles a great deal of correspondence between chapter officers, members and ASM Headquarters on information pertinent to membership records.

### For Every Question, an Answer

It isn't always merely a matter of pulling a card from the file. The department is called upon to answer many questions from chapters, members and others at ASM National Headquarters. Quite often, finding the answers requires much research and cross-checking. Who was chairman of such-and-such chapter in 1937? How many members did ASM have in 1926? Much of this

**ASM MEMBERSHIP  
RECORDS REPARTMENT**

**B. Risdon Barber, Manager**

Dorothy Cowell	Alberta Jackson
Elizabeth Doctor	Dorothea Lewis
Margaret Frieund	Marjorie Narusch
Margaret Goschnick	Anna Marie Parocai
Clara Hall	Joan Thompson
Jacob Hollenbach	Ruth Thorin

information must come from individual chapters and 25-year veteran members of the Society, who are called on to search their memories from time to time. Their help has been invaluable. Fortunately, ASM-2000 will benefit from the highly mechanized system of ASM-1960 in gleaning information from the archives.

**100,000 Contacts a Month**

These 13 people, however, do much more than keep the records—they use them. Each member—every one of the 32,642—is contacted, on the average, three times each month! That's nearly 100,000 contacts. For instance, mailing labels for the monthly ASM publications, *Metal Progress* and *Metals Review*, are prepared from master IBM cards on an Addressograph-Multigraph electronic printer. Numerous additional special mailings to members, including publications distributed on a subscription basis, add to the complexity of the operation.

For many years, all ASM members were billed for annual dues on Mar. 1. As the Society's membership climbed, however, it became necessary to do the billing in cycles. Under this system, about 2500 members are notified each month, except March, at which time 8600 are contacted.

**Doing Things Electronically**

Prior to May 1960 all mailings to members were addressed from Addressograph plates. Now, however, thanks to a "marriage" of IBM data processing equipment and the Addressograph-Multigraph electronic printer, the time involved in record keeping, addressing and invoicing has been significantly reduced. A considerable savings has also been effected in space required for records and equipment.

*Metal Progress* and *Metals Review* go to the entire membership. The runs for these labels take approximately 6 hr. each, machine time, on ASM's present system—compared to 2½ days each on the former plate system.

**ASM'S Widening Horizons**

ASM membership, as it has grown in size, has broadened in scope. While all members retain a basic interest in metalworking and its related processes and products, each member requires specific information for his own needs. A good example of this is the subscription-type publications of the Society. Some members, for instance, reap great benefits from *Review of Metal Literature*. Others will find the new *Metals Engineering Quarterly* of inestimable value in keeping up-to-date with advances in metalworking.

All of this poses unique problems for the Membership Records department. With so many members receiving so many different mailings, the time required to process the mailings is multiplied. The new IBM/AM system allows a "search" to be made of the membership to find out which members want which publications. The cards turned up by these searches are then used to make mailing labels and returned to the master "deck" by automatic collating. All this is accomplished in less than half the time previously required.

**Tomorrow's Members**

Realizing that ASM's student members will wish to become full members of the Society upon graduation, each spring the department contacts both the graduating student members and their professors. In this manner ASM learns the new business affiliation made by the student and very often his new address. A letter to the secretary of the chapter in the area to which the student is moving, familiarizing the chapter with the newcomer's background, aids the chapter in adding new, aggressive young members to their group. Cooperation of students, professors and chapter officers in this effort is of great importance to industry and to the growth and future of ASM.

**Helping Headquarters Do the Job**

Membership Records' duties do not end with service to the members. For instance, the Society has the circulation of *Metal Progress*, its highly esteemed metals engineering monthly, audited annually by the Audit Bureau of Circulation. This requires the department to compile semi-annual reports on the complete breakdown of ASM membership, as well as outside subscribers, as to industry, position and geographical location.

That isn't all. Mr. Barber estimates that substantially over one million pieces of mail are addressed every year for all ASM departments and activities. All in a day's work for the Membership Records department—13 people vital to the success of ASM National Headquarters' efforts to serve that most important individual—the ASM member.

# Missile Materials Require Ideal Combination of Properties

The first stage of the Saturn launch vehicle is an interesting case example of the accomplishments of the George C. Marshall Space Flight Center, W. R. Lucas, NASA, told the **Birmingham** Chapter because it involved a relatively massive structure, is complex and presented many unusual materials problems.

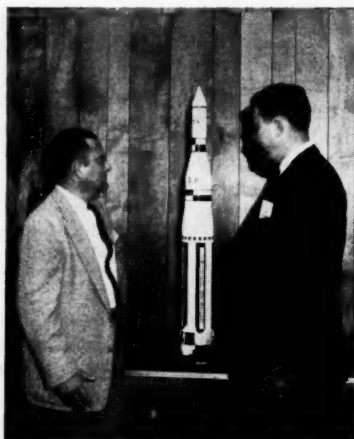
In his talk on "Materials Problems Associated With Space Vehicle Boosters", Dr. Lucas, who is chief, engineering materials branch of the Center, pointed out that five of the nine tanks of the Saturn are filled with liquid oxygen. The resultant low temperature causes a contraction of  $2\frac{1}{2}$  in. in the length of these tanks while the remaining fuel tanks remain dimensionally stable.

Although projects related to space flight and launch vehicles require specialized knowledge in the entire field of materials technology, Dr. Lucas concentrated largely on problems related to metals. Current launch vehicle or missile structural requirements demand the ultimate strength-to-weight ratio, relative ease and reliability of fabrication, availability of sheets and shapes, strength at elevated temperatures, strength and ductility at subzero temperatures, erosion and corrosion resistance, aging characteristics and nominal costs.

Welding problems in new materials and low-temperature properties of welds were discussed. The hazard of extrapolating the very low temperature ( $-320^{\circ}$  F.) properties of parent metal to weldments in this metal was demonstrated through the recitation of an unsatisfactory experience with the Redstone missile. This experience has resulted in a comprehensive study at MSFC of the low-temperature behavior of weldments. Compatibility of materials with liquid oxygen was shown to be a serious problem. Although liquid oxygen compatibility is primarily a problem with organic materials, certain metals, such as some alloys of titanium and magnesium, react explosively with liquid oxygen under conditions of impact. Such problems as these are related to the vehicle or missile even before it is

launched and a further, possibly more stringent, set of materials problems are presented by the space environment subsequent to the launching operation.

Thermal problems may arise from either aerodynamic heating during ascent or re-entry, or from absorption of radiant energy in



**MATERIALS PROBLEMS OF SATURN POINTED OUT**—W. R. Lucas of the Marshall Space Flight Center, Huntsville, Ala., refers to a space vehicle booster during a talk before the **Birmingham** Chapter. His presentation covered the varied materials problems in manufacturing space vehicles.

space. The transfer of heat by radiation presents a heating as well as a cooling problem. Equilibrium heat is controlled by means of a paint or coating with tailored optical properties.

The ultra-high vacuum of space affects materials through evaporation of volatile components and/or removal of surface films. The evaporation of volatile components will affect bulk mechanical and physical properties, and the removal of surface films is known to affect friction and possible creep rupture and fatigue. Apparently, vacuum does not affect the initiation of fatigue cracks but reduces the rate of propagation of the cracks.

Space radiation presents a great hazard to organic materials although metals and alloys are rela-

tively resistant to radiation damage. Meteoric bombardment which was once thought to be a major hazard of space flight does not appear to be a significant problem now except perhaps for brittle materials such as glass and ceramic coatings.

It is known that the total effect of all the various components of the space environments are of even greater importance than any single aspect.

Probably the limitations of missile and launch vehicle design are primarily due to a lack of materials suitable for the application and the lack of adequate processing or manufacturing techniques. It was emphasized that to build the large boosters of today, we must have useful materials—useful not only from the standpoint of meeting the physical demands in terms of stress, weight, heat resistance, etc., but also in fabrication.

Obviously, the answers to all materials problems are not known but most of the problems are recognized and the challenge for the materials engineer is clear.

## Beryllium Described as True Space Age Metal

A new exotic metal, beryllium, plays a vital role in missile and space flight systems. W. H. Santachi, manager of research and development, Beryllium Corp., Reading, Pa., told the **San Fernando Valley** Chapter that beryllium is a true space age material; it possesses low density, high strength, an elastic modulus  $1\frac{1}{2}$  times that of steel and a high melting point.

Growth of the beryllium industry was shown by the increase in consumption of beryl ore from 1000 tons in 1949 to 8000 tons in 1959. The large increase in production capacity was attributed to the AEC's 1957 contracts for delivery of 1,000,000 lb. of beryllium over a five-year period.

Two basic methods are employed to win the metal from the beryl which contains nominally 10% BeO; the thermal reduction of beryllium fluoride used in the U.S. and the electrolysis of fused salts used in France. The Beryllium Corp. produces beryllium "bead" at its Hazleton, Pa., Nuclear Division.

While beryllium is nearly the same weight as magnesium and only 25% the weight of steel, a



chart of relative weights of various metals based on aluminum as unity showed beryllium to be less than  $\frac{1}{2}$  the weight of magnesium and about  $\frac{1}{6}$  that of steel. Relative weights were derived from a formula using the density and elastic moduli of materials and the density and modulus of aluminum.

Wrought forms of beryllium have tensile strengths of 75,000 psi. and the metal retains approximately 50% of its strength up to 1000°F. Its high specific heat and good thermal conductivity make it useful as a heat sink.

Beryllium and beryllia (BeO) play an important part in nuclear reactors due to their low thermal neutron absorption cross sections.

As an alloying agent, beryllium is best known for its use with copper as a hardening agent. It also finds applications in the casting of high-strength aluminum alloys, such as Tens-50, due to its function as a deoxidizer and in promoting fluidity.

Nearly all useful forms of beryllium are made by the powder metallurgy process. Ingots are comminuted to chips on a lathe, the chips being simultaneously collected by a high volume, high velocity air ducting system. After attritioning the chip to powder, billets are made by pressing in vacuo at unit pressures of 250 to 1000 psi. at temperatures from 1950 to 2000°F. Billets are subsequently machined directly to hardware items or to billets, slabs, etc., for further fabrication by rolling, extrusion or forging. Chips are carefully collected through air ducts during machining to prevent air contamination with beryllium which is a toxic metal.

Some of the research work currently being sponsored by the Air Force and Navy was described. Emphasis was placed on alloying studies aimed at stabilizing the body-centered-cubic beta phase believed to be the allotropic form existing within about 50°F. of the melting point, and on deformation studies to produce third-dimensional ductility in wrought forms of the metal.

Availability of a large supply of beryllium, considered by some to be a problem area, may be alleviated in the not too distant future if recent claims of discoveries of beryllium-bearing ores in Idaho and Utah prove fruitful. A large domestic supply could lower the cost

of the metal, thus stimulating increased usage and accelerating technological breakthroughs. (*Reported by A. Townhill.*)

## Home Uses of Metals Are Clues to Trends in Industry

The metallurgist studying the nature of metals and searching for answers to metal problems should occasionally step out of his technical path to view the significant social and economic factors which relate to his profession, according to C. H. Lorig, technical director, Battelle Memorial Institute, and past president ASM, speaking before the **Richmond Chapter**.

To illustrate this theme, Dr. Lorig quoted the statistic that 60% of today's brides own their dinner flatware and 50% of that flatware is stainless steel. This statistic is humanly significant. Young brides accept gifts of sterling silver with alacrity but they prefer to invest their money in the prestige of a luxury automobile. A new trend is apparent, brought on by the high cost of the automobile, which indicates that the home may become the outlet for prestige and that metals may be used to put the Cadillac stamp on a home. We may hear a householder boast, "Oh, no! not ordinary steel—all of our fenestration is stainless steel (or aluminum)". Thus metals will assume the Cadillac quality.

Metals touch our lives in a wonderful way. The housewife is aided in her cooking and housework by a vast array of metal appliances. The television sets and "Hi-Fi" sets in our living room could not have been developed without metals. A variety of metals make possible the mechanism and provide the glitter of our automobiles. The cost of electric power today is about the same rate it was a decade ago. This is due in a large measure to metallurgists who succeeded in raising the operating temperature for steam power generation from 350°F. in 1900 to 1250°F. as of today. Jet planes which cross the Atlantic in 4 to 6 hr. depend on metals to withstand 1650°F. heat.

It is historically significant that those people who developed complex civilizations were people who refined and used metals. Man was enabled to use his highest faculty, his intellect, in the construction of complex tools which depended on

metals for their existence. Metallurgists today are charting the course of human action by their success in solving metal problems in aircraft and missiles.

Dr. Lorig predicted a bright future for the nuclear metals uranium and thorium. These metals have wide application to industry, agriculture, medicine and food processing. They can provide motor power in ships and planes as well as central station power. They can irradiate new varieties of plants which have drought and disease resistance, early maturity and higher yields. They may be the answer to unsolved problems in medicine. These metals may solve the food preservation problem by eliminating freezing, heating and chemical processing. Although, as Dr. Lorig said, these are green fruits and may wither on the vine.

## Chapter Briefs

Present and future forging methods were detailed before the **Chicago-Western Chapter** by R. B. Shingledecker, metallurgical director of forging and heating, Ladish Co. Among future needs, the speaker reported, is research to replace empirical data with formulated principles to guide forgers in working refractory metals and other materials not commercially forgeable at the present time. (*Reported by R. L. Hosfield.*)

The effects of strain aging are extremely important in the manufacture of low carbon sheet and strip for deep drawing applications, according to Samuel Epstein, technical advisor, Bethlehem Steel Co., speaking before the **Rochester Chapter**. The jog in the stress strain curve is a characteristic of iron and steel in soft condition. The jog shows itself as stretcher lines because of the nonuniform elongation within the part during drawing and causes undesirable roughening of the surface. The jog can be eliminated by a final skin pass in processing. However, in aging steels, the jog will return upon storage and sheet regains the tendency to stretcher strain. The nonaging aluminum killed and vanadium rimming steels are not susceptible to these aging effects. (*Reported by Ronald J. Schur.*)

The steps through which an inventor should go to protect his ideas were described before the **North**

**Texas Chapter** by Howard E. Moore, Dallas patent attorney. Mr. Moore placed special emphasis on the necessity for full disclosure and confidence of the inventor in his patent attorney, so that all claims could be made and a better patent granted. In describing patents, Mr. Moore stated that it is easier to describe what a patent is not than to describe what it is. Moore cited several case examples of the complexity of patent laws. (Reported by J. C. Herr.)

The **Warren Chapter** became the second ASM chapter to hold a regular meeting at ASM's Metals Park headquarters. The first was the nearby **Cleveland Chapter**. Twenty-nine members made the trip and were hosted at the Society's headquarters by Howard E. Boyer, Metals Handbook managing editor. (Reported by Don L. Robinson.)

Uses of low-melting alloys in the metalworking industries were illustrated before the **St. Louis Chapter** by Robert S. Darnell of the Cerro de Pasco Corp. Most of the talk was devoted to the use of bismuth alloys which were described as tools of manufacture rather than finished products. The alloys' principal uses in industry are covered by the broad categories of anchoring, workholding, coring and as dies and

punches for short run work, as well as in patterns, models and molds. (Reported by David E. Murray.)

"The Reasons and Results of Research" and "Kitchen Planning" were subjects of joint talks before a ladies' night audience of the **Carolinas Chapter**. Speakers on the subjects were: Alfred B. Craig, director of research, Chemstrand Corp., and Lynn Gillespie, manager of sales training, Youngstown Kitchens. (Reported by O. J. Fischer.)

In recent years, the interest in the properties of metals at cryogenic temperatures has "boomed" from the curiosity of pure science stage into an era of considerable practical significance. With this in mind, the low-temperature mechanical behavior of metals and the problems associated with their use was discussed by E. T. Wessel, metallurgy department, research laboratories, Westinghouse Electric Corp., before the **Columbus Chapter**. The behavior and characteristics of metals at low temperatures can be divided into three general categories. The first and most common of these deals with low-temperature brittleness (the ductile-to-brittle transition phenomena); the second category is concerned with unconventional modes of plastic de-

formation, which in practice may be every bit as serious as brittleness; a third category is related to metallurgical stability and the influence of phase transformations on the resulting mechanical behavior.

The recent progress and the current state of knowledge in these areas was elaborated on by Mr. Wessel.

**Notre Dame Chapter ASM** heard Merrill A. Scheil, ASM trustee and national secretary, discuss the many-sided problem of stress and stress-corrosion induced failure of metals in service in a talk thoroughly documented with some typical problems and their solutions which he has been presented with during his many years with the A. O. Smith Corp. of Milwaukee.

The growth and development of new techniques in the "Science of Arc Welding" was presented by Clarence E. Jackson, Linde Co., at a recent **Tri-City** dinner meeting. The plasma arc, forerunner of arc welding advancement, is proving to be a means of providing the high temperatures required in the cutting, welding or spraying of some rocket age materials. Temperatures ranging up to 60,000°F. are attained by containing an arc within a steam of high-current density.

**LIBRARIANS HEAR SPECIAL MEI SERIES**—Nearly 30 members of the Metals Division of the Special Libraries Association attended a special two-day MEI metallurgy course following the recent National Metal Congress. Six members of the

ASM staff presented lectures on various phases of metallurgy. Shown during a question period are Lewis Berger, MEI training director, John Parina, ASM book editor, and A. deS. Brasunas, MEI director.





The resultant increase of collisions between electrons and molecules provides the desired effect. As an added point of interest, an informative collection of colored slides taken by the author during a tour of Western Europe and the Soviet Union drew parallels between our welding techniques and those of European countries.

## Welding Developments Outlined at Utah

"Recent Developments in Welding" was the subject of a talk presented before the **Utah** Chapter by Darwin Christofferson, welding engineer, Chicago Bridge and Iron Co. Mr. Christofferson is a member of the Utah Chapter.

One recent development in the welding field is the electroslag process, an arcless type of electric welding in which a molten slag, resisting the flow of an electric current, creates a high heat, which melts both the consumable electrode and the adjoining base metal. Welding must be performed in the vertical position with sliding, water-cooled shoes spanning the weld path to maintain a pool of molten metal and slag between the structures being welded. The Electroslag process is applied best to heavy plates.

Electron beam welding is also new. In principle it consists of bombarding the surface of the workpiece with a concentrated beam of fast moving electrons which produce sufficient heat for welding to take place. The process has several advantages including welds with virtually no contamination, close control of penetration, low thermal distortion and close dimensional control. The major disadvantage is that the welding operation must be performed in a vacuum which limits the versatility of the process. Workers also must be protected from harmful radiation. At present the process is most used in welding materials such as beryllium, titanium and tantalum, although it does have applications in other fields.

In friction welding, a method developed by a machinist in Russia in 1956, the metal of the weld joint is heated to its plastic state by the friction of the two butting surfaces revolving against each other under pressure. As soon as the temperature required for pressure welding is reached (1650-2375° F. for steel),

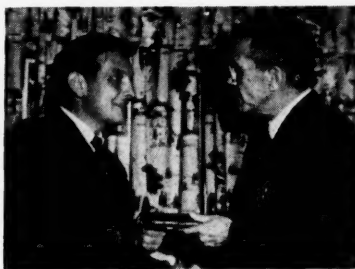
relative motion is stopped and the pieces being welded are allowed to cool with the clamping pressure maintained. The tensile strength, ductility and impact properties of such welds are equal to or better than those of the base metal. Future designs involving friction welds will include welding pipe lines and joining noncircular cross sections, such as rails, and welding plastics.

Among the many problems faced in development of rockets and missiles is joining many of the new materials without distortion, shrinkage or contamination. For these applications brazing is becoming more essential. Vacuum and other controlled atmosphere brazing is being used to assemble many of the special materials used in these industries. (Reported by Ralph R. Hitchcock.)

## Delaware High Schools Receive Book on Metals

Fifty high schools in Delaware and adjoining parts of Pennsylvania have been presented with a copy of J. Gordon Parr's book, "Man, Metals, and Modern Magic". To stimulate interest in metallurgy among high-school students, the **Wilmington** Chapter selected this entertaining but factual story of metallurgical progress to be presented to the library of the high schools. Dale Bittinger, chapter chairman, has personally delivered each book along with the message that his Chapter is deeply interested in fostering careers in metallurgy. The Chapter's executive committee has made this donation of a book an annual affair.

*Dale Bittinger (right), Wilmington Chapter chairman, is seen here delivering a copy of J. Gordon Parr's book, "Man, Metals, and Modern Magic" to Charles Cinaglin, instructor, H. Fletcher Brown Vocational High School, Wilmington, Del.*



## Two Speakers Featured at Carolinas Chapter Meeting

Talks on low-alloy, high-strength steels and the crafts of Old Salem, N. C. featured a meeting of the **Carolinas** Chapter at which 20 new members were welcomed to the group.

In discussing low-alloys steels, Clarence L. Alterberger, Great Lakes Steel Corp., stressed the economy of such steels. "If the price of high-strength steel, in dollars per 100 lb., does not overshadow the reduction in weight, a cost saving to the buyer will result". He pointed out that high strength would not be economical if it were acquired at a sacrifice of formability or weldability.

Old Salem crafts were described by Frank R. Albright, director of museums for Old Salem, Inc., Winston-Salem, N. C. The speaker covered the cultural and living customs of the Moravian sect which settled in the area as well as their crafts and trades. Scarcities of metallic ores with which to work so restricted the metals trades that wooden pegs were used in construction and wood was even used for springs.

Chapter Treasurer T. E. Gregory reported that an award of \$200 has been made to the Student Body Educational Fund and a check in that amount was presented to W. W. Austin. (Reported by O. J. Fischer)

## Advantages of Atmosphere Heat Treating Described

The elimination of expensive after treatments as well as improved mechanical properties were among the advantages for controlled atmosphere heat treating cited by E. J. Pavesic, field metallurgist, Lindberg Steel Treating Co., Chicago, in speaking before the **Syracuse** Chapter. However, to secure these advantages, heat treating must be carried out in modern equipment.

There has been considerable improvement in heat treating equipment in recent years, according to Pavesic. Among the major developments were the development of endothermic atmosphere generators and radiant tubes for fuel fired heating furnaces.

Together with the improvements in heat treating equipment, our scientific knowledge has increased on carbon alloy and toolsteels, Pavesic reported.

## What the Metallurgist Is Doing About Fatigue

"What the Metallurgist Is Doing About Fatigue" was discussed by John A. Bennett in Washington. Mr. Bennett is chief of the Mechanical Metallurgy Section of the National Bureau of Standards and is responsible for the analysis of failed parts recovered from airplane crash wreckage for the Civil Aeronautics Board to determine the probable cause of the crash. A number of these crashes have been due to fatigue failures, either of highly stressed or moderately stressed parts. Mr. Bennett showed pictures of specific fractures and pointed out the distinguishing features that indicate the relative stress level to which the part had been subjected in service, as well as the point of origin of the fracture.

The situation is made even more acute by the current trend in metallurgical development. The commercially important aluminum alloys all depend upon precipitation hardening mechanisms and the so-called high-temperature superalloys are also precipitation hardening systems with a complex nonequilibrium structure. This is just the opposite of the type of structure conducive to good fatigue resistance. Mr. Bennett emphasized the importance of a structure in thermodynamic equilibrium for good fatigue resistance. For instance, the SAE alloy 4340 will endure apparently an infinite number of cycles if stressed below a certain value, but the fatigue strength of the commonly used 2024 aluminum alloy, which is precipitation hardening, decreases continuously with increasing numbers of cycles.

Mr. Bennett described the fatigue fracture mechanism as definitely a two-stage process. During the first stage nothing appears to be happening which can be correlated with fatigue damage, but after a considerable number of cycles a crack will appear in a slip band region within a grain. This is the beginning of the second stage. Damage done during the first stage, so long as no crack has yet formed, may sometimes be eliminated by understressing or annealing. It is believed that during this stage dislocation and impurities migrate to the slip band regions. Thus, as one might expect, randomly oriented fine-grain material has better fatigue resistance than coarse-grain

material, and metal exhibiting only a simple slip system is better than one displaying a high degree of cross slip. The presence of inclusions or precipitate below the surface, or surface defects and corrosion reactions on the surface, will contribute to the nucleation of the first crack. Because fatigue cracks usually start at the surface, merely because there is a greater likelihood of an imperfection there, the practice of improving fatigue resistance by putting a high residual compressive stress in the surface has been of great practical importance.

However, the speaker's primary thesis was that we do not know even today what all the variables are that play a part in the fatigue mechanism. Many variables are recognized, such as corrosion, surface defects, inclusions, grain size and others previously discussed, but even the interaction of these is not well understood. As a result, there have been many research studies reported wherein one or two variables were compared with the observed fatigue resistance and conclusions drawn, whereas in many of these cases some other variable, which the experimenter was not even conscious of, was actually responsible for the results. (Reported by John R. Cuthill.)

## Roberts Honored at Detroit Chapter Meeting

More than 300 members of the Detroit Chapter were in attendance at a recent meeting to hear George A. Roberts present the 18th Annual William Park Woodside Memorial Lecture. Dr. Roberts, vice-president, Vanadium-Alloys Steel Co., and past president ASM, spoke on "Tools, Steels and High-Strength Structures".

Dr. Roberts gave credit to the toolmakers for adapting steels of hardnesses in the order of 68 R<sub>C</sub> to everyday devices, when 50 R<sub>C</sub> is considered a criterion of hardness above which constructional steels are notch sensitive. Because toolsteels are produced for wear resistance, hot hardness and toughness, Dr. Roberts described the necessary compositions and separate alloy effects required to create high values of each of these three. For high wear resistance he showed the effect of composition on the increase of microhardness from 790

Knoop (60.5 R<sub>C</sub>) for iron-carbon martensite and 1150 Knoop for iron carbide, to 2520 Knoop for complex vanadium carbides. He graphically demonstrated how normal tensile tests become impractical when hardness values exceed 57 R<sub>C</sub> because of hard-to-measure elongation values under 4%, and accompanying brittle-type fractures. This led to the adoption of the bend test for toolsteels, in which hardness may exceed 65 R<sub>C</sub> and yield strengths may reach 400,000 psi. A curve demonstrated that the bend test and tensile test properties can be correlated from hardnesses of 25 R<sub>C</sub> through 57 R<sub>C</sub>. Above the latter hardness, the bend yield strength values are critically dependent on both hardness and composition.

Dr. Roberts described three groupings of steels used for structural purposes. The first requires controlled quenching for hardening, and often the element silicon is added to raise the permissible tempering temperature. This avoids the embrittlement which accompanies low-temperature tempering and permits tensile strength of 220,000-260,000 psi. steels such as used in landing gear. Another group includes the air hardening types of 5% chromium steels employing high tempering and secondary hardening temperatures. The remaining group includes the stainless, cold work or precipitation hardened alloys.

Recent notch testing programs with notches of near infinite sharpness predict failure of any of these steels for structural purposes at strengths over 200,000-220,000 psi. Yet even pressure vessels have been made successfully, with good material and good manufacturing practices, from materials such as 5% chromium ultra-high-strength steel at unit yield strengths of 240,000 psi. A design criterion of less than "sharp notches" thus appears practical and is indeed necessary if still higher strengths are to be used. In the last three or four years, vacuum melting and degassing have offered improvements to the steel quality so vital to missile development.

Holding much future promise is "ausforming", or warm working steels still in the austenitic state above transformation temperatures. Although the mechanism is not yet clearly understood, the process may result in steels of over 400,000 psi. ultimate strength.



# CHAPTER MEETING CALENDAR



Albuquerque	Feb. 24	Hotts Dinner Bell Restaurant	D. S. Wise	Rocks in Your Lives
Atlanta	Feb. 13			Heat Treating Steel
Baltimore	Feb. 20		M. R. Achter	Effect of Environment in Space Flight on Metallurgical Properties
Birmingham	Feb. 7	Gold Nuggett		Ladies Night
Buffalo	Feb. 9		Carl E. Swartz	Continuous Casting
Calumet	Feb. 14	Phil Smidt Restaurant		Cold Heading
Cedar Rapids	Feb. 13	Roosevelt Hotel		Plating of Nonferrous Metals
Chicago	Feb. 13	Furniture Club	D. K. Hanink	Metallurgy and Quality Control for Rocket Motor Cases
Chicago-Western	Feb. 20	Old Spinning Wheel	W. R. Hibbard	Metallurgical Education in Russia
Cleveland	Feb. 6		E. E. Thum	Zay Jeffries and Metal Progress
Columbus	Feb. 1	Battelle Auditorium	H. S. Jerabeck	
Dayton	Feb. 8	Engineers Club	Woodie Garber	Metals in Modern Architecture
Delaware Valley	Feb. 18	Hotel Stacey		Valentine Dinner Dance
Detroit	Feb. 13		W. A. Pennington	Diffusion and Transport of Carbon in Ferrous Metals
Lehigh Valley	Feb. 6	Hotel Traylor	Paul Efield	The Backward Look
Louisville	Feb. 7		T. E. Leontis	Magnesium Alloys and Their Applications
Mahoning Valley	Feb. 11	Mural Room		Valentine Dance
Milwaukee	Feb. 14	Astor Hotel	H. J. Bates	Gear Steels and Heat Treatment of Gears
Mohawk Valley	Feb. 6		Anthony Debons	Of Mice, Men and Space
Muncie	Feb. 14		A. S. Doty	Powder Metallurgy
New Hampshire	Feb. 10		V. E. Lysaght	Hardness Testing
New Jersey	Feb. 20	Essex House	Glenn D. Boyer	Elevated Temperature Drawn Steels
North Texas	Feb. 3		Carl H. Samans	Metal Headaches in Making Gasoline
Northeast				
Pennsylvania	Feb. 9		Donald Robertson	Radiation Pyrometry
Notre Dame	Feb. 8		R. A. Grange	Isothermal Transformation of Austenite
Oak Ridge	Feb. 15	Holiday Inn	Carl H. Samans	Elevated Temperature Attack of Steels by Gas Mixtures
Ontario	Feb. 6	Fischers Hotel	D. M. J. Lavigne	Atomic Reactor Metals
Oregon	Feb. 10	Congress Hotel	Circuit Speaker	
Ottawa Valley	Feb. 7		W. A. Pennington	
Peoria	Feb. 13	Vonachen's Junction	E. W. Feddersen	Production Applications of High Energy Rate
Philadelphia	Feb. 24	Engineers Club	Robert B. Heppenstall	Of Metals, Methods and Man
Phoenix	Feb. 21		John Pearson	Explosive Forming
Pittsburgh	Feb. 10	Penn Sheraton	Hubert N. Alyea	Lucky Accidents, Great Discoveries and the Trained Mind
Purdue	Feb. 21	Purdue Memorial Union	A. S. Jameson	Benefits of Metallurgical Research in Industry
Rocky Mountain	Feb. 17	Oxford Hotel	Carl H. Samans	Problems With Steel Pressure Vessels
Saginaw Valley	Feb. 14	High Life Inn	C. P. Mueller	Refractory Metals Properties and Processing
St. Louis	Feb. 16	Clayton Elks' Club	R. W. Bailey	Continuous Casting
Sangamon Valley	Feb. 16	Decatur	A. O. Fischer	Corrosion—Theory and Practice
San Fernando Valley	Feb. 28	Glen Aire Country Club	Phillip M. McKenna	Recent Developments in Cemented Carbides
Southeast Ohio	Feb. 2		C. M. Cosman	Electric Furnace Ferroalloy Industry in the U.S.
Springfield	Feb. 20			Dynapak Forging
Syracuse	Feb. 7	Onondaga Hotel	Phillip Cary	Tests for Modern Quenchants
Toledo	Feb. 9	Maumee River Yacht Club		High Speed Heating for Surface Hardening
Tri-City	Feb. 28		A. H. Rauch	Factors Affecting the Selection of Cast Ferrous Metals
Tulsa	Feb. 7		Omer Blodgett	Designing for Welding
Upper Ohio Valley	Feb. 8		Mars G. Fontana	Some Unusual Corrosion Problems
Washington	Feb. 13	Amer. Assoc. Univ. Women's Club	Cyril Stanley Smith	History of the Science of Metals
Wichita	Feb. 21		Richard Manning	Ultra High Strength Steels
Wilmington	Feb. 8	Fabian's Restaurant	Eugene E. Hoffman	Liquid Metals in High-Temperature Reactors and Space Power Plants
York	Feb. 8		John Convey	Fundamental Research in Metals

## ASM NATIONAL AND REGIONAL TECHNICAL MEETINGS

New Mexico Regional Conference, Albuquerque, N.M., Feb. 16 & 17, 1961  
 "Recent Developments in Materials for Nuclear Applications"  
 Western Metal Congress, Los Angeles, Calif., March 20-24, 1961  
 Indiana Symposium, Purdue University, W. Lafayette, Ind., Apr. 15, 1961  
 "Vacuum Metallurgy"  
 Chicago-Western Seminar, Chicago, Ill., Apr. 20, 1961  
 "Properties of Metallic Surfaces"  
 Southern Metals Conference, Atlanta, Ga., Apr. 24-26, 1961  
 National Metal Congress, Detroit, Mich., Oct. 23-27, 1961



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### POSITIONS OPEN

#### East

**OPENINGS:** Quality Control Engineer, Stress Analysts, Development Engineers for expanding division in nuclear power plant and refinery equipment field with computer facilities. Location: Dunkirk, New York. Engineering degree and applicable experience preferred; some recent graduates considered. Forward resumes to: G. Y. Taylor, Administrative Personnel Services Director, Alco Products, Inc., Schenectady 5, N.Y.

**METALLURGICAL ENGINEERS:** One to five years experience (heat treating or metals joining preferred), desiring production rather than lab work, supervisory qualities. Excellent opportunities with well-established, rapidly growing commercial heat treater with four Massachusetts plants. Send complete resume to: C. A. Lindblad, New England Metallurgical Corp., 475 Dorchester Ave., South Boston 27, Mass.

**METALLURGIST:** Excellent opportunity for man with B.S. or M.S. degree, with minimum of five years experience, to establish and operate metallographic laboratory in large metropolitan New Jersey research laboratory engaged in semiconductor and thermoelectric work. Must possess good laboratory technique as well as sound theoretical background. Salary commensurate with experience. Send resume. Box 1-5.

**PHYSICAL METALLURGIST:** Large metropolitan New Jersey research laboratory currently engaged in semiconductor and thermoelectric field seeks senior man with broad and proven background in physical metallurgy. Minimum of five years experience. Ph.D. desirable but not essential. Salary open. Send complete resume. Box 1-10.

**METALLURGICAL ENGINEER:** Under 35 years of age with at least five years experience in foundry or other molten metals or refractories. Must be capable of carrying on development programs in refractories and molten metal melting problems in connection with induction melting furnaces. Position would require extensive contacts with customers, sales groups and other engineers in working out technical problems as the division metallurgist. Location: Eastern Pennsylvania, New Jersey area. Salary—\$8000-10,000. Box 1-15.

**ALUMINUM EXTRUSION PLANT METALLURGIST:** Opening for man to take charge of metallurgical development and quality control functions in medium-size extrusion plant. Prefer individual with 5 to 10 years experience in casting, extrusion or related areas of aluminum industry. Send resume and salary requirements. Box 1-20.

#### Midwest

**FELLOWSHIPS AND ASSISTANTSHIPS:** For advanced degree students in the fields of metallurgy, ceramics and semiconductors. A new materials research center provides exceptional facilities for basic research and graduate studies in kinetics, physical ceramics and metallurgy, imperfection studies in solids, physics of solids, thermodynamics and X-ray diffraction. Applicants with degrees in mathematics, the physical sciences or engineering will be considered. Dept. of Metallurgy and Materials Science, The Technological Institute, Evanston, Ill.

**METALLURGICAL ENGINEER:** Under 35 years of age with at least five years experience in heat treating or metallurgical laboratory. Position involves work on development and application of heat treating and other metallurgical problems in connection with induction heating processes and equipment. Would require extensive contacts with customers, sales force and other engineers in working out technical problems as the division metallurgist. Location: Northeastern Ohio. Salary—\$8000-10,000. Box 1-25.

**FORGING ENGINEER:** Excellent opportunity with oil well manufacturer in Houston for experienced forging engineer, age 36 or

younger. Engineering degree required. Moving expenses paid by company. Contact: W. F. Cannon, Personnel Manager, Reed Roller Bit Co., P. O. Box 2119, Houston 1, Tex.

**METALLURGIST:** Ph.D. for supervisory position in research center. Familiar with present-day concepts of the behavior of metals and alloys (metal physics) and modern research techniques in physical metallurgy. Variety of problems in ferrous and nonferrous (atomic energy) fields. Ability to treat fundamental aspects theoretically and experimentally. Write: Personnel Manager, Babcock & Wilcox Research Center, Alliance, Ohio.

**DEVELOPMENT ENGINEER:** Metallurgical, mechanical or chemical engineer needed to assume responsibilities in product and equipment development activities relating to the powdered metallurgy field. Some experience in any phase of powdered metallurgy of the refractory metals is desirable. Send complete resume to: Professional Personnel Office, Fansteel Metallurgical Corp., North Chicago, Ill.

**FELLOWSHIPS AND ASSISTANTSHIPS:** In metallurgical engineering. For graduate studies in the fields of extractive and physical metallurgy, with emphasis on surface chemistry, thermodynamics, kinetics, crystal imperfection, dislocation theory, plastic deformation, diffusion, corrosion and solidification. Applicants should write to: Prof. A. W. Schlechten, Chairman, Dept. of Metallurgical Engineering, Missouri School of Mines and Metallurgy, Rolla, Mo.

#### Southwest

**TEACHING POSITION:** Assistant or associate professorship dependent upon qualifications and experience, Ph.D. desired, to participate in expanding graduate program in physical metallurgy and materials engineering. Position calls for interest in graduate instruction in theoretical metallurgy and in ceramic materials and their behavior at elevated temperatures. An interest in kinetics and transformations is also desirable. Opportunity to augment salary through organized and supported research on campus. Climate and living conditions ideal. Write to: T. M. Morris, Dept. of Mining and Metallurgical Engineering, University of Arizona, Tucson, Ariz.

#### Government

**WELDING ENGINEER:** For grades GS-5, 7 for Pearl Harbor Naval Shipyard. Welding and allied processes; approval of welding equipment and materials and training and certification of welding operators. Must have degree with a major in welding engineering or metallurgy. Transportation provided. Send U.S. Government Standard Form 57, available at any first class Post Office, to: Navy Overseas Employment Office (Pacific), Federal Office Bldg., San Francisco 2, Calif.

### POSITIONS WANTED

**RESEARCH AND TECHNICAL WRITER:** Ten years experience with leading aluminum producer. Wrote training courses, technical books and catalogs for past four years. Familiar with corrosion resistance of aluminum alloys; knows essentials of gas shielded-arc welding. Background includes 2½ years office supervision. Desires responsible writing or administrative position. Age 45, married. Box 1-30.

**METALLURGICAL ENGINEER:** B.S. in chemical engineering, M.S. in metallurgy, age 47, married, 20 years experience in heat treating and nonferrous products. Expert in basic steel processing, foundry products, heat treatment, welding, specialized metal joining, coatings, toolsteels, specialized machinery, aircraft products, tools and machining. Top-level supervisory experience. Patents. Location immaterial. Resume on request. Box 1-40.

**TECHNICAL EXECUTIVE OR METALS DEVELOPMENT MANAGER:** Excellent experience in research and manufacturing metallurgy extending to both ferrous and nonferrous products. Expert in basic steel processing, foundry products, heat treatment, welding, specialized metal joining, coatings, toolsteels, specialized machinery, aircraft products, tools and machining. Top-level supervisory experience. Patents. Location immaterial. Resume on request. Box 1-40.

**METALLURGIST:** M.S., plus graduate business management study. Age 35, married, three children. Nine years experience in applied research and development. Practical and diverse experience in physical metallurgy and fabrication of ferrous, nonferrous and refractory materials. Knowledge of extrusion, rolling, forging, swaging, drawing. Desires supervisory position with managerial potential. Box 1-50.

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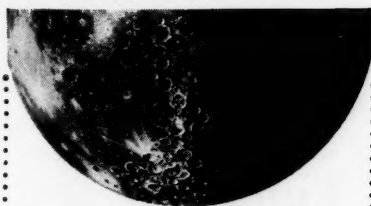
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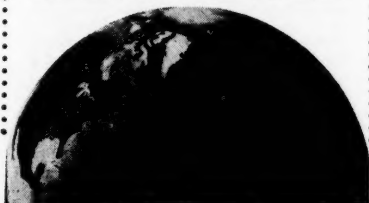
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Director of Research—Dept. 551-RA  
6633 Canoga Avenue  
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**Director of Research**  
The International Nickel Company, Inc.  
67 Wall Street, New York 5, N. Y.

**METALLURGICAL ENGINEER:** Dutch citizen, 35 years old, eligible to become U.S. citizen Oct. 1961. B.S., moving to West Coast, seeks employment in western states. Experience in physical metallurgy, familiar with most testing techniques. American experience in cold pressure welding, high-speed deformation of metals and thermal stability of crimped connections. Box 1-55.

**METALLURGICAL ENGINEER:** M.S., age 37. Nine years experience, principally in alloy development and materials application in electrical, automotive and flight propulsion industries. Thorough knowledge of high-temperature, refractory, ferrous and nonferrous alloys. Desires responsible position in metallurgical field, with opportunities for advancement. Box 1-60.

**MATERIALS OR METALLURGICAL ENGINEER:** Age 32, family. Seven years experience in process chemical industry including inspection of process equipment, analysis of equipment failures, corrosion testing and plant maintenance. Practical knowledge of application of nonmetals and protective coatings. Resume on request. Box 1-65.

**METALLURGICAL ENGINEER:** B.S., age 31, married two children. Six years experience in extrusion and remelt aluminum metallurgy includes development and control of D.C. casting, preheating, heat treating and aging practices for all wrought aluminum alloys. Also nondestructive and destructive testing. Desires work in production with definite possibilities for advancement. Relocate anywhere in the U.S. Box 1-70.

**PRACTICAL APPLIED RESEARCH AND DEVELOPMENT METALLURGIST:** M.S., age 40. Experience in all ferrous materials with emphasis on cast metals, from gray iron to stainless steel. Record of successful cooperation with production, quality control and sales department. Desires responsibility with maximum opportunity to apply initiative, judgment and capacity for hard work. Box 1-75.

**METALLURGICAL ENGINEER:** B.S., age 32. Presently in materials research and development. Six years experience in materials engineering with special emphasis on testing and heat treating. Good knowledge of high-strength steel, magnesium and titanium systems. Desires position with West Coast or Intermountain western concern not connected with or dependent on the defense industry. Box 1-80.

**METALLURGICAL ENGINEER:** B.S., married, experienced with integrated steel producer. Desires responsible position in the metallurgical field or technical sales. \$7800 minimum annual salary. Midwest preferred. Resume on request. Box 1-85.

**RESEARCH METALLOGRAPHER:** B.A., chemistry, age 42, single. Nine years experience in metallurgical laboratory. Excellent background in emission spectroscopy, radiography, electron and optical metallography. Outstanding interest and aptitude for electron and optical metallography. Desires responsible position where ability in both fields can be applied and utilized. Work in connection with Committee E-4 of ASTM highly desired. Box 1-90.

**LIBRARIAN OR REFERENCE LIBRARIAN:** Varied metals and engineering experi-

ence. Has organized and set up three new libraries. Particularly interested in reports and special materials. Member: ADI, ASLIB, SLA, ASM, ISI. Now in the West. Prefers West or Southwest. Box 1-95.

**CHIEF METALLURGIST:** 38 years old, B.S. degree in metallurgical engineering (Case-1944). Nonferrous background, experienced in technical control, quality improvement, customer service of wire and sheet and products thereof. Background integrated with plastics and corrosion fields. Wants technical management or supervisory position in industry with good growth potential. Will relocate. Box 1-100.

**METALLURGIST (M.S.) AND CHEMICAL ENGINEER (B.S.):** Age 32, veteran, married, two children. Four and one-half years experience with major electronic firm in development and investigation of solders and fluxes, and also failure analysis and consultation. Several publications. Is seeking position in research and development in same or allied field. Box 1-105.

**POWDER METALLURGIST:** With five years experience, ferrous pilot plant, tungsten and molybdenum alloys. Also chemical education. Able to translate Russian. Wants location near university giving graduate degrees to evening students. Write or phone: G. Brown, 7715 E. 75th, Indianapolis 26, Ind.

**TECHNICAL DIRECTOR:** B.S., M.B.A. degrees. Strong technical, sales, administrative background with high-level responsibilities. Broad experience in most ferrous and nonferrous metals including "exotics". Desires challenging position with metals producer or fabricator, any location. Detailed resume on request. Box 1-110.

**ACADEMIC POSITION:** Associate professor of physics, Ph.D. in chemistry, age 39, married. Seven years teaching, eight years industrial and institute research experience. Background in physics, chemistry, metallurgy, astronomy, geology. Desires teaching position emphasizing undergraduate physics and physical sciences. Interested in overseas position. Available immediately. Box 1-115.

**CHIEF ENGINEER OR MANUFACTURING MANAGER:** B.S. in M.E., Purdue 1934, age 50, good health, married with two children. Twenty-six years of excellent manufacturing and engineering experiences. Twelve years with job shop producing precision stampings and welded fabrications for over 100 customers. Available immediately. Box 1-120.

**MECHANICAL ENGINEER:** B.S. degree, manufacturing research and development, product design and development, research engineer. Broad experience in manufacturing, metalworking, plastics, castings, machine design, appliance design. Desires responsible position in research, development, technical management. Box 1-125.

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The Chemstrand Corporation's nylon manufacturing plant at Pensacola, Florida is seeking a graduate engineer to assist the chief metallurgist in shop problems related to materials selection, welding and heat treatment. Experience with chemical processing equipment desired.

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# ANNOUNCING A NEW PUBLICATION...

## at Reduced Subscription Rates for American Society For Metals Members

The first, or "collector's" edition of a new American Society for Metals publication will be available this coming February, 1961. The new publication is a magazine well in keeping with the ASM tradition of editorial excellence. The new magazine is titled, "Metals Engineering Quarterly." ASM members may subscribe at reduced rates.

The content of the new quarterly will include technical papers presented at metals engineering programs developed and supervised by the ASM Metals Engineering Program Committee.

The new publication will serve as a sister publication to the well-known and respected ASM Transactions. But whereas the ASM Transactions is published to carry technical papers of a scientific nature, the Metals Engineering Quarterly will present technical papers of a considerably more practical nature.

For example, the February issue includes the following papers in its 112 pages:

### HIGH-TEMPERATURE PROPERTIES OF RENÉ 41 AND ASTROLOY

### PROPERTIES OF GRAY AND DUC- TILE IRONS

### FRACTURE TOUGHNESS OF STEEL FOR PRESSURE VESSELS

### FAILURE OF STEAM-WATER HEAT EXCHANGERS

### PROCEDURES FOR HIGH-TEMPERA- TURE FAILURES EVALUATION

### APM ALLOYS

### STRENGTHENING LOW-ALLOY STEELS BY DEFORMING AUSTENITE

### REFINEMENT OF ALUMINUM-21% SILICON CASTING ALLOYS

Each of the above papers was presented at the recent 42nd National Metal Congress in Philadelphia. Future issues of the Metals Engineering Quarterly will contain other MEPC papers presented at the Philadelphia Congress, at regional metal congresses such as the 1961 Western Metal Congress, and from regional programs developed through MEPC throughout the year in various parts of the country.

The Metals Engineering Quarterly has no counterpart in ASM publications and has been created to offer ASM members the opportunity to obtain practical, useful information on a wide variety of subjects at the least cost possible.

The Metals Engineering Quarterly will be issued in February, May, August and November of each year. The magazine will be 8½ x 11 in size. Binders will be available for the four Quarterly issues. ASM members may subscribe at a rate of \$6.00 per year. (Non-members, \$10.00 per year.)

ASM members can now build one of the most up-to-date, extensive and authoritative libraries at an extremely small investment.

Please enter your subscription by using the coupon below. You may enclose your check or request to be invoiced at a later date. Should the Metals Engineering Quarterly not meet your requirements as a source of useful information, return the February issue within ten days and your subscription rate will be returned to you in full.

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